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Master of Commerce in Information Systems

COMMUNITY PARTICIPATORY DESIGN IN THE INFORMATION SYSTEMS  
DEVELOPMENT PROCESS IN AFRICA: A SYSTEMATIC LITERATURE REVIEW

by

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## Acronyms

ACM	The Association for Computing Machinery
ACM-CHI	The ACM Conference of Human-Computer Interaction
ACM-ICEC	The ACM Annual International Conference on Electronic Commerce
ACM-ICTD	The ACM Information and Communication Technologies and Development
ACM-OZCHI	The ACM Computer-Human Interaction of Australia
ACM-SIGCHI	The ACM Special Interest Group on Computer-Human Interaction
ACM-SIGITE	The ACM Conference in Information Technology Education
AIS	Association of Information Systems
AR	Action Research
CoDesign	International Journal of CoCreation in Design and the Arts
CSCW	Computer Supported Cooperative Work
DS	Design Science
EBSCO	EBSCO e-books, e-journals and academic database
<i>e-methodologies</i>	<i>Electronic-methodologies</i>
ETHICS	Effective Technical and Human Implementation of Computer System
FLOSS	Free/Libre and Open Source Software
GIS	Geographic Information Systems
GPIS	Geographical Participatory Information System
HCI	Human Computer Interaction
HCI4D	Human Computer Interaction for Development
HISP	Heath Information Systems Program
ICEGOV	International Conference on Theory and Practice of Electronic Governance
iConference	The Conference on critical Information issues in contemporary society
ICT	Information and Communication Technology
ICT4D	Information and Communication Technology for Development
IEEE Xplore	Institute of Electrical and Electronics Engineers Digital Library
InfoDev	World Bank Group working on innovation, technology, and entrepreneurship
IS	Information Systems
ISD	Information Systems Development
ISP	Internet Service Provider
IST-Africa	Information Society, ICT and/or Science Technology and Innovation adoption, Policy and Research in Africa
IT	Information Technology
LL	Living Lab
LLISA	Living Labs in Southern Africa
MGOV4D	Mobile Governance (MGOV) Strategies for Development
MICT4D	Mobile Information and Communication Technologies (ICT) for development
MIS	Management Information Systems
MISQ	Management Information Systems Quarterly Journal
NGOs	Non-Governmental Organisations
OECD	Organisation for Economic Co-operation and Development
OER	Open Educational Resources
OSS	Open Source Software
PCR	Participatory Design Community Research
PD	Participatory Design
SAICSIT	South African Institute for Computer Scientists and Information Technologists
WSIS	United Nations' World Summit on the Information Society



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# Dedications

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I dedicate my work to you all for your invaluable encouragement, support and love.*

## Abstract

*Participatory design (PD) pertains to the different ways of incorporating ideas and acts of organisational members in designing, developing and evaluating an Information Systems (IS) artefact. The context of this study is community organisations in African settings participating in the designing and developing of an IS artefact. The study traces and synthesises findings from 95 articles on community PD in Information Systems Development in Africa. It argues that community PD consists of vast diverse constructs and implementations. This produced and reproduced concept is formulated in five major themes of: conceptualisations; ethics; standards; checks and balances and approaches; and perspectives and methodologies of PD. The themes constitute the possible ways of classifying PD research and practice in African settings. The results demonstrate that there is a wide belief that participation is one of the vital ingredients necessary for successful designing of IS artefacts for human development. However, the different elements involved in PD involve much discussion on what is known and needs to be known about PD and how to achieve the desired results by PD. The study uses Critical Research philosophy to pay special attention to the behavioural and attitudinal arguments of the different PD practices on community organisations. The researcher found Design Science (DS) principles that centre on devising an artefact as appropriate to frame this work. In sum, through the use of Critical Research and a DS lens, the researcher found that community participation is important in designing a useful IS artefact, but treacherous if misunderstood and inappropriately implemented.*

*Keywords: Community Participatory Design, Literature Review, Africa, Design Science*

# **1. Introduction**

## **1.1 Background and motivation**

The concept of community participatory design (PD) in Information Systems Development (ISD) has garnered attention within the African context. In this study, community PD refers to the designing, development and use of Information Systems (IS) by a community organisation. A community organisation is defined in this study as a formal or informal organisation for group interactions and bringing people together to achieve some common goal. Community organisations in Africa have been, in one form or another, participating in ISD by informing, implementing and evaluating systems and re-arranging praxes and behaviours. Recently, community organisations in North Africa tried to take part in designing, developing and using IS facilities to improve representation, transparency and accountability (Shirazi, 2013). Elsewhere, professionals have been trying to map out behaviours and attitudes of participants on social media, networks and platforms towards a change process facilitated by IS (e.g. Bennett & Segerberg, 2012; Loader, Vromen & Xenos, 2014). Yet there is no literature, to the best of the researcher's knowledge, which discuss community PD as a universal phenomenon in ISD in Africa.

In North America, the Management Information Systems (MIS) research and practice on participation in systems design, development and use is oriented mainly within business organisations (e.g. Sawyer, Guinan & Coopriider, 2010). In Europe, PD practice that historically started in the Scandinavian countries submits to design orientations leaning towards democracy and equality between employers and employees in work settings (Kensing & Blomberg, 1998). Even though PD studies, especially from Scandanivia and Germany, lean more towards humanitarian values, devotion and learning; the socio-cultural settings of Europe are however, different from that of Africa (Floyd, Mehl, Reisin, Schimidt & Wolf, 1989). Yasuoka and Sakurai (2012) highlight differences in Scandinavian and Japanese settings, but contend that PD can be adapted to a different society. This study examine past studies to appraise if PD in Africa is the same or different from other regions.

The concept of community participation is poorly defined, is spread under different labels and has vast tentacles, causing confusion over expectations, best courses of action and valuation

of outcomes (Cooke & Kothari, 2001; Mutenda, Mpazanje & Chigona, 2011). Yet there are hardly any studies on community PD in mainstream IS research with a focus on African contexts. Most of the work on community PD in Africa in IS mainstream research has been fairly peripheral. Literature in mainstream research in IS has extensively dealt with user participation and user involvement strands in systems development and use (Markus & Mao, 2004; Salomao, Sabiescu & Cantoni, 2013). However, almost all of these studies in mainstream research concern work contexts of organisations in developed countries (Kensing & Blomberg, 1998). Consequently, the community PD work in African contexts becomes peripheral, rather than holistically contributing knowledge to serve wider, more strategic development objectives (Thompson & Walsham, 2010). The researcher argues that scholars need to expand horizons in order to understand the universal phenomena of community PD in African contexts, to analyse not only use but design and development dimensions of an IS.

Acts of taking part in ISD present both opportunities and difficulties in designing and building purposive and responsive IS for and by the people in different African communities. As Kling (1996) asserts, the consequences of organisational stakeholders coming together to make a collective effort of juggling practices, capabilities, routines, roles and power relations, when people 'computerise', is not universally positive. In North African uprisings and participation, the results of using Information Systems to sensitise people and to organise crowds to topple governments and push development agendas were both positive and negative. In his book *'Networks of Outrage and Hope: Social Movements in the Internet Age'*, Castells (2013) describes the subversions and struggle for power of participants in Tunisia and Egypt to determine the flow of control, ownership, rights and even money. Castells coins the notion of 'programmers' and 'switchers' to refer to actors involved in designing, developing and using networks, internet and other spaces of organising. Evidently, inasmuch as participation in designing and using IS may be purported to contribute towards employment, productivity and increased knowledge, it can also lead to unemployment, disparity, instability and heightened marginalisation, amongst other complex social ills (Heeks, 1999).

The fundamental challenge still persisting, given the mixed bag of possibilities, is to get a coherent understanding of the specific contours and characteristics of PD in African contexts. The study departs therefore, from the *need* to learn how practitioners practise, examine and report on PD, by, with and for community organisations in Africa. The primary motive is to

assess and synthesise what is known; need to know and to find ways to close knowledge gaps about the community PD concept. To meet this aim, the study clarifies: the community PD construct and its variants; who participates and to what extent; the beliefs among designers and beneficiary organisations; the evaluation and measurement of participation; and the development, organisation and use of the participatory knowledge base. The study also illustrates and discusses claims that structuring and use of PD tools and techniques in developing settings are different from those of developed contexts. The data is derived from a set of systematically selected papers on PD practice in African community organisations.

## **1.2 Research question and significance**

### **1.2.1 Research question**

To investigate the practice of PD in developing environments, the primary research question the researcher poses is:

*How do researchers comprehend, apply, pursue, and report community participatory design in their practice and/or interest in improving the quality of social life through IS in Africa?*

The initial premise is that community PD is the independent variable, while development (or any accord of development such as change, transformation, empowerment and growth) is the dependent variable. In their review on user participation, He and King (2008) follow the same selection and treatment for independent and dependent variables.

In community PD, parties engage communities with the idea that 'including the once excluded' in the project activities may lead to development. In other words, proponents of PD believe that there is a link between community participation and human development. This study aims to characterise this relationship by answering the following questions. How do IS practitioners characterise the relationships between participation and development? What kinds of participation-development relationships are being implicitly and explicitly practised and reported by IS researchers and practitioners? Going beyond this dependency association, what other attributes enable or constrain attaining efficacy in community PD for social

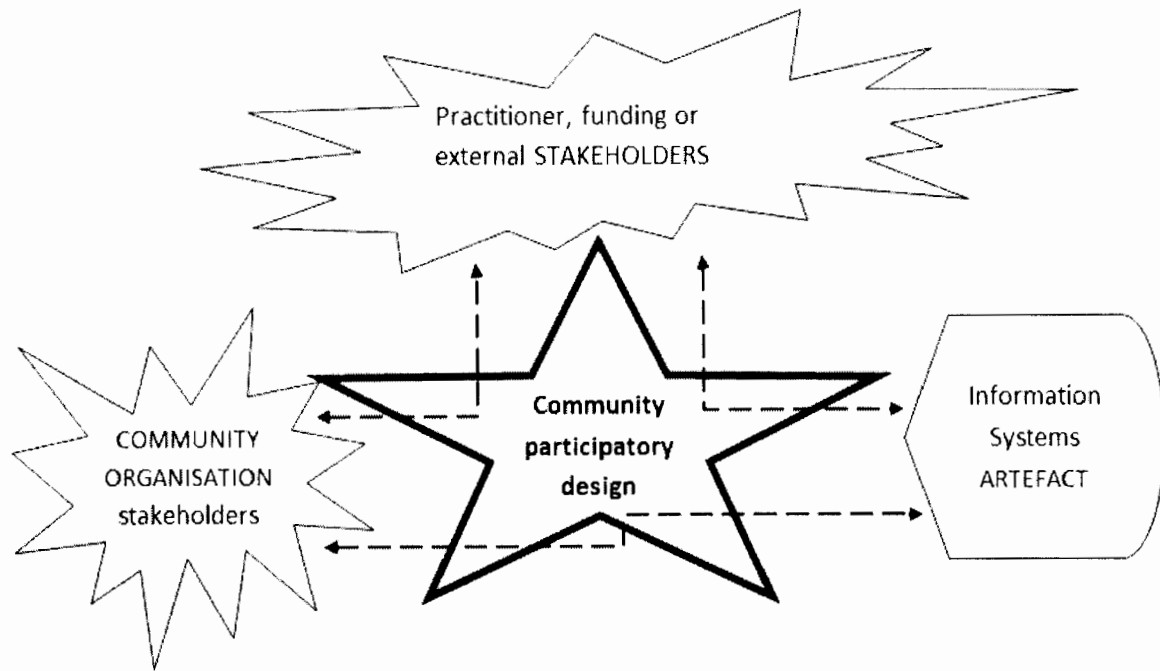
development via IS? What attestations can the study provide from practice, upon which the IS scholarship may ground building of theory, models, methods and best practices?

### **1.2.2 Importance of the study**

There is an array of community organisational participations. A simple form of dyadic participation may comprise of two ends of participation namely: 'no participation' and 'full participation'. Within the continuum view of participation, scholars and practitioners suggest different types, degrees and natures of participation in between the 'none' and 'full' participation extremes. Arnstein's (1969) and Choguill's (1996) ladders of participation and Lindsay's (2003) pyramid of user-led design are examples of participation degrees. Understanding the nature of participation being practiced helps in extending (challenging) the technological affordances (constraints) for development through Information Systems (ISs). The significance of tackling this topic is to qualify community PD and to highlight best practices for success as well as practices that lead to failure.

## **1.3 The scope of the study**

The present study essentially covers the community participation concept as practised in IS design and development in African contexts. The principal unit of analysis is the social artefacts and activities resulting from interactions among community organisations, PD practitioners and IS artefacts.



**Figure 1.1: An Abstract of Participatory Design in ISD in a Community Organisation (Merkel et al. 2004; Carroll & Rosson, 2007)**

The abstract in Figure 1.1 shows the interplay between a community organisation, practitioners and the artefact, loosely referred to as community PD in ISD (Merkel et al. 2004; Carroll & Rosson, 2007). The belief behind participatory design in ISD is to broaden ideas and knowledge and funding (Iivari, Hirschheim & Klein, 2004).

An artefact is simply a product or object made by individuals to solve a problem or an artistic representation of a culture or performance. Hevner, March, Park and Ram (2004, p. 77) define IS artefacts as *constructs* (vocabulary and symbols), *models* (abstractions and representations), *methods* (algorithms and practices), and/or *instantiations* (implemented and prototype systems). Orlikowski and Iacono (2001) unveil different ways in which an IS artefact can be conceptualised: as a *nominal*; as a *computation*; as a *tool*; as a *proxy*; and as an *ensemble*. Orlikowski and Iacono (2001) posit encompassing views of IS artefacts, from technology absence (nominal view), through technology tools, to technology as a package of social and technical aspects (ensemble view). The researcher conceives, following Orlikowski & Iacono's (2001) proxy and ensemble views, IS artefacts not solely as technical products, but also as perceptions, diffusion and capital and as production/development combination, structure, network and/or as embedded systems. In other words, the researcher submits to beliefs that *artefacts* are:



- embedded in some historical, cultural, time, community or discourse;
- made up of 'fragile' components that interrelate to work together;
- burgeoning, dynamic and are dependent on given community characteristics like history, culture, knowledge, economy;
- not neutral, given or natural since they are man-made 'utilities' for a problem domain (Orlikowski & Iacono, 2001).

To investigate PD phenomenon [the abstracted middle bold star area in Figure 1.1], the researcher assesses, evaluates and observes the acts and states of the observational units of community organisations, practitioner/external stakeholders and IS artefact. Figure 1.1 illustrates a simple community PD phenomenon of the interactivity, activity and interplays (arrows in Figure 1.1) among community organisation, practitioners and the artefact. Put differently, the present systematic review study assesses, reflects and critiques the characteristics or manifestations of the observational units prior to, during and after participation of a community organisation in an IS artefact design. The unit of sampling encompasses virtual or geographically localised community undergoing development by use and design IS artefacts.

#### **1.4 The purpose of the study**

The present study looks into the ways in which practitioners and researchers think of, report on and pursue the phenomenon of PD in Africa. The aim of the study is to analyse particular forms of exercising PD that may afford or constrain organisational development in developing settings. The making up of affordances and constraints – design – of an artefact is dependent on the relational views between materiality and the people, i.e. imbrications of material and human agencies (Leonardi, 2011). The functional affordances and constraints of an artefact are related to how people reconcile their goals (human agency) given what the artefact does or does not (material agency). In this study affordances imply strategically 'designed-in' properties and qualities of an artefact, which are easily perceptible and give strong clues of what it *does* (Norman, 1999). The role of this study is thus to gain an understanding on how community participation serves or inhibits in designing and constructing flexible basic routines or technologies in Africa. The study focus on the unique and relevant ways in which community participation is conceptualised to build artefact affordances and constraints, as

well as how this phenomenon travels and transforms through space, time and cultures. In reviewing community participation, readers *“will encounter a spectrum of views and practices, in which the stories are mixed in different proportions”* (Addleson, 2013, p. 32). In a nutshell, the present systematic review aims to:

- i. synthesise knowledge by revealing what is known about the community PD phenomena within African community organisations,
- ii. identify knowledge gaps by revealing what scholars still need to know about the phenomena,
- iii. propose ways to close knowledge gaps.

## **1.5 The prologue of literature review study design**

### **1.5.1 Why a literature review?**

Given the hype in participation (World Bank, 1996; InfoDev, 2003), scholars ought to ask how community PD in IS-enabled propositions is conceived, disseminated and exerted in developing countries. More specifically, developing countries need to ask how their participation is doing in enabling or constraining development. In this age, where ISs are considered to permeate all aspects of organisational life, scholars have to grasp both the positive and possible dark sides associated with attempts to inform and influence courses of social life through ISs. A single enquiry can rarely provide a generalisable and definitive answer to such research questions, focusing on, for instance, Africa as a developing arena (Cooper, 1989). A literature review – an evaluation and synthesis of data from multiple studies - is a thrust to identify and work on the positives and negatives of community PD from a number of sources. Having reviewed data on community participation, knowledge has to be built on how far has PD in ISD enhanced or diminished social development.

The viewpoint that participation may be either a categorical or continuum construct requires us not to restrict our investigation to one study, but rather to multiple studies on PD. ‘Differences of’ and ‘types of’ nomenclatures are used to categorise community participation. A combination of previously conducted studies contributes in identifying, reflecting and critiquing of specific types, degrees and natures of participation. A literature review therefore

generates a discourse and accumulates a foundational and holistic body of knowledge on community PD in Africa.

### **1.5.2 Systematic literature review study design**

This section defines certain assumptions about literature review study designs since they are rare compared to empirical research and research essays (Rowe, 2014). A literature review is an overview of past research on a topic. Literature reviews identify, describe and, in certain cases, analyse high quality research and summarise knowledge on a topical issue. Ideally, all previous work relevant to a topic has to be included. The present study conforms to the systematic review design. Under systematic review, a specific topic or research question is critiqued through the systematic identification, methodological appraisal and synthesis of data.

Unlike narrative literature review designs, systematic reviews follow a strict and improved procedure to locate, assess and synthesise data (past research) on a topic. Further, the procedural way of discovering, assessing and interpreting findings on the contemporary topic in systematic review study design is meant to be reproducible. The methodology chapter explicitly and comprehensively discusses the predetermined data collection and selection criteria of the present systematic review.

The present study design, contrary to meta-analytic reviews, is not based purely on quantitative integration and analysis of literature. By leaning towards systematic review design and not adopting the statistical rigour of meta-analysis, the present study aimed to have flexibility to pool and critique studies of homogeneous and heterogeneous types and publications. In suitable scenarios, meta-analysis has greater statistical power than pure systematic reviews. However, the inclusion and exclusion criteria (under meta-analysis) of studies relevant to the contemporary topic would be inappropriate, since candidate review studies are bound to be from different groups, and outcomes may be dissimilar. The resulting weighting variances and publication bias under meta-analysis may lead to inconsistency and dissimilarities that are not ideal for statistical comparison and analysis. The advantage of systematic reviews over meta-analysis is that the former does not exclude studies for which computation of a statistic is impossible. Furthermore, systematic reviews are not restricted to quantitative aggregation and analysis such as meta-analysis.

It goes without saying that literature reviews are long and the citations are many (Webster & Watson, 2002). A literature review may be conceptually structured by adopting a guiding theory or setting up competing models or point of views (Torraco, 2005). This study adopts Design Science (DS) as a guiding theoretical and analytical framework and uses critical social theory as the philosophical system of thinking.

### **1.5.3 Why Design Science is appropriate to guide a study on participation**

In practice, a participation literature review contributes to solving organisational problems by rigorously and systematically intervening in designing best structures, processes and praxes. The researcher argues that DS is a framework of choice to achieve the synthesis and analysis of data to evaluate and build on existing design knowledge. The DS model is relevant because of its practical organising-devising orientation and its ability to expand the horizons of scientific knowledge (Hevner et al. 2004; Gregor & Jones, 2007). Earlier, PD is defined as the involvement of all pertaining stakeholders in the systems development process in order to provide the ideas based on experience and practice (Kyng, 2010). Therefore, PD relates to acts of incorporating efforts of all stakeholders in devising a solution to a problem domain. In accordance with Venable (2011), DS is a theoretical framework of critical inquiry which nurtures the solving of organisational problems by invention, design and development of new ideas towards useful solutions. Bratteteig and Wagner (2012) liken the invention, design and development of new ideas, techniques and methods by organisational parties to 'participatory creativity'. However, the question of using DS instead of Action Research (AR) to investigate the topics on organisational intervention is in certain cases raised.

To Sein, Henfridsson, Purao, Rossi and Lindgren (2011) and Papas, O'Keefe and Seltsikas (2012) there is a resemblance between DS and AR. However, according to Greenbaum and Loi (2012, p. 81) AR tends to *"bend more toward outcomes, starting out with the needs of the participants, with researchers engaging and supporting them in participant-defined goals"*. The argument of not favouring models such as AR which bends towards *outcomes* is that they lack details on how to achieve the set targets. Following on the outcome-centredness reasoning, Yetim, Draxler, Stevens and Wulf (2012) argue that previous studies on participation are largely empirically or normatively oriented, lacking the design orientation. Markus and Mao (2004) and livari et al. (2009) challenge empirical findings in past studies on

participation and call for new orientations to cater for diversity in users and contexts. Hevner et al. (2004) put forward DS as an appropriate model for designing artefacts to support participation. What makes DS salient is that it models how both the process and the product are shaped (Greenbaum & Loi, 2012). Using DS to guide inquiry on participation thus paves the way to look not only into the pragmatics of actions and knowledge, but also the designing and developing of the structure, process and agency of achieving the desired outcomes.

Design Science involves analysis of the development, use and performance of designed artefacts to understand, explain and improve the social system in which the artefact is embedded (Alter, 2012). Studies by Lieberman, Paternò, Klann and Wulf (2006), Germonprez, Hovorka and Collopy (2007), Fischer (2008) and Wulf, Pipek and Won (2008) employ design frames to look into user participation and interaction. These examples of studies on tailorable systems or end-user development studies focus on how users modify and redesign systems in the context of use. A tailorable system is a system that enables the users to modify and integrate features during the continual process of devising and creating a system to suit their concerns and activities (Germonprez et al. 2007). At the centre of interactions and modifications – referred herein as participation – there are elements of designing the structure for communication, decision-making and carrying out activities (Hirschheim, 1985). The ideas underlying Design Science of action and knowledge matches with participation practice therefore it is appropriate to use DS to analyse the organisational participation in ISD.

## **1.6 Organisation of the research**

The rest of the review study is structured as follows: Chapter Two considers the literature on community, community participation and ISD concepts. The chapter focuses on the worldwide perspectives of key terms underlying community participation in ISD in developing contexts. Chapter Three provides DS elements and principles as the conceptual framework for evaluating the related literature. The researcher mainly uses the DS elements developed by McKay, Marshall and Hirschheim (2012) to identify and categorise attributes of selected literature on community PD. Chapter Four discusses research methodology aspects of data sources, selection criteria and data analysis. The synthesis of main research findings is provided in Chapter Five. In Chapter Six, the study discusses what is known and what IS community need to know about PD; and makes propositions of how to close knowledge gaps

and solve problems in practice. Chapter Seven reflects on future work and concludes the review study.

## 2. An overview of community participatory design in ISD

The previous chapter introduced the assumptions of community PD in Information Systems Development (ISD) and general guidelines of a literature review study design. This chapter considers in detail the literature related to the key concepts underlying community PD in ISD. The concepts are defined in relation to how practitioners worldwide exercise them against how the terms are employed in African contexts. The objective of the definitions is to clarify and conceptualise key terms as well as delineating the scope of the study. The literature review on terms clarifies use, misuse, conceptions, misconceptions and contentious exercising of the concepts underlying community PD topic. In this chapter, research thrusts are mapped out from the defining conceptions and ideals of community PD phenomena. The research thrusts set out a path of reviewing community participation in the design and development of ISs in Africa. The discussion on past literature reviews on participation in ISD, similar but contextually different from this review, is presented last.

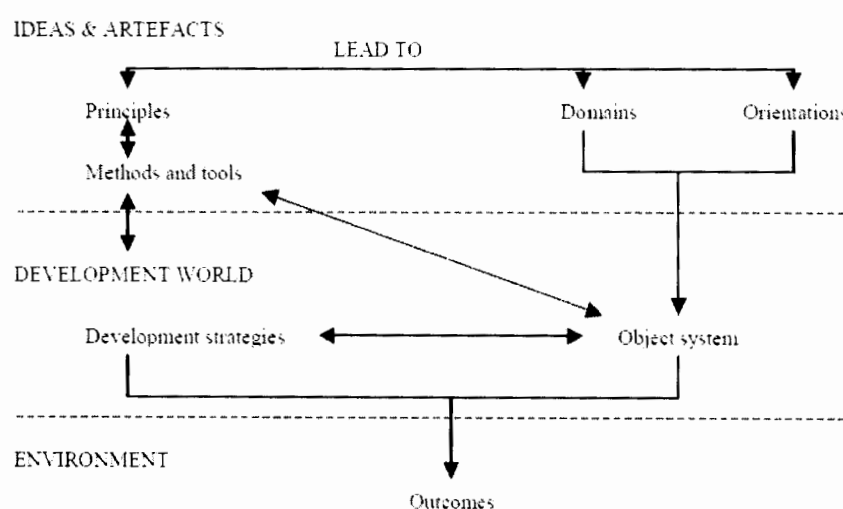
### 2.1 Information Systems Development in general

Possibly, a point of departure to understand the ISD activity is to clarify Information Systems and development terms. Information Systems (IS) is defined broadly and is permeated with syntactically similar but distinct fields like 'Information Technology' (IT), 'Information and Communication Technology' (ICT), and certain stand-alone notions such as 'information', 'communication', and/or 'technology'. Because of the multi-, inter-, and trans-disciplinary nature of IS discipline, there have been questions on what IS is/is not and whether IS is even a discipline (Land, 1993). Mingers and Stowell (1997) edited a book on the question of IS discipline. Either way, this study defines IS simply as a social system (Walsham, Symons & Waema, 1990) with some technical aspects, in addition to the communicative, political, social and economic aspects involved in a work activity. Important to note, technology is not the sole essence of IS, but people, organisations, rules, commands and standards are other essential aspects of IS (Land, 1993).

Although the ideation, design and construction of system applications are vast, the concept of *development* in ISD in developing contexts is perplexing. In mainstream research, 'development' in ISD refers to the formulation, design, construction and evaluation of

artefacts, prototypes, applications and systems (Hirschheim, Klein & Lyytinen, 1996). Hence, in some circles, system development is also known as system engineering (Nunamaker, Chen & Purdin, 1991). In non-orthodox practice, 'development' in ISD tends to be more diffused to include *inter alia* human, environment and social development, in addition to the traditional understandings of systems development and engineering (Wilson & Howcroft, 2002).

The ISD model by Hirschheim et al. (1996) is useful in understanding the general aspects of ISD activity (Figure 2.1). Hirschheim and colleagues depict that ISD consists of three interrelated levels, namely: ideas and artefacts; development world; and the environment. The ideas and artefacts level builds up knowledge and artefacts to execute a task. It consists of methods and tools, principles, domains of change (technology, language and organisation) and orientations. Hirschheim et al. (1996, p. 10) define orientations, drawing from Habermas' social action theory, as a "*consistent set of attitudes, beliefs, assumptions and intentions which a developer [participant] brings to the process of IS change*". Orientations provide justifications and capture values, goals, intentions; they represent an underlying drive behind a human activity in the ISD process.



**Figure 2.1: The Generic Model of ISD by Hirschheim et al. (1996, p. 23)**

Domains and orientations show us 'what' aspects are at interplay in the ideation and artefacts level of an ISD process. Scholars in ISD research and practice, having known the 'what', are more concerned about the 'how' (Mursu, 2002) – how the underlying ideas and artefacts interrelate with the development world which ultimately results in ISD outcomes and consequences in the environment. To tackle that question theoretically, Hirschheim et al.



(1996) assert that domains and orientations cross-relate to produce *object system classes* (Table 2.1). Object system classes are mechanisms of conceiving and classifying the differences in intentions, behaviours and social orders exhibited in an ISD process. The matrix of object system classes shows interdependence in research approaches, streams and directions in a 'fragmented adhocracy' of ISD (Banville & Landry, 1989).

**Table 2.1: Object system classes and examples of possible objects**

Domains	Orientations			
	Instrumental	Control Strategic	Sense-making Communicative	Argumentation Discursive
Technology	<i>Information Technology Systems</i> Hardware and telecommunication configuration; Program structure and modules; Database and file structures			
Language	<i>Formalized Symbol Manipulation Systems</i> Data models and dictionaries; Data integrity mechanisms; Screen and form designs; Model management systems.	<i>Manipulative Communication Systems</i> Definition of terms and rules; Communication channels; Access rights; Data integrity	<i>Symbolic Interaction Systems</i> Speech acts; Intentions; Meanings; Metaphors	<i>Systems for Rational Argumentation</i> Arguments; Warrants; Breakdowns; Pragmatic inference
Organization	<i>Mechanistic Social Systems</i> Tasks; Decision Processes; Business processes; Organizational structures	<i>Political Systems</i> Power Structures; Resource dependencies; Interest groups; Sources of authority; Indirect influence; Negotiated orders	<i>Cultural Social Systems</i> Values, beliefs; Myths, rituals; Negotiated meanings and practices	<i>Systems for Institutional Checks and Balances</i> Domination free discourse; Justification and minimization of power; Truth and justice; Due process

**Source: Hirschheim et al. (1996, p. 17)**

The ISD activity involves a number of stakeholders – any individual or organisational institution that affects or is affected by ISD activities and processes. The ability to identify stakeholders is as critical as managing stakeholders in a given ISD activity. In a broad way, the stakeholders of an ISD activity include sponsors, professionals and the general population. Depending on the context of ISD, sponsors may be government, a business organisation, a non-governmental organisation, philanthropy or any funding party thereof. Professionals may include any individual or institution with expertise to research, design, implement, manage, control and/or own the plans and products of the ISD process. Likewise, the general population, depending on the context of the ISD process, may include workers, users, respondents, society, the public, community, non-users, beneficiaries and many other labels

given to stakeholders of such a calibre. The dominant stakeholders include sponsors, professionals or any party with 'power', 'money' and 'knowledge' to influence, control and manipulate. Hence, sponsors and professionals are usually the leaders, planners, managers, designers, developers and the authority in an ISD process. Sponsors and professionals are key and typically dominant stakeholders. The majority of the intended beneficiary community are key but weak stakeholders in the ISD process. However, it is naïve to assume that the general population has no power, because they may coerce control and influence if aroused and agitated. For instance, in the 1970s, workers in Scandinavian corporations had to use trade unions to gain power to influence and discuss with managers the design and development of systems they were supposed to use. Nowadays, the general population is able to:

- create and edit content such as on Wikipedia,
- influence design and development through Open development platforms, Free/Libre and Open Source Software (FLOSS)
- design, develop and use Information Systems to incite people, to give people reasons to protest; to organise and mobilise crowds.

Community organisations are no longer passive consumers of information and knowledge; they are now participative in activities of systems design and development. They relay information and knowledge and have become 'programmers' of the underlying system and 'switchers' of the network underneath (Castells, 2013). It is compelling, therefore, to review literature on what specific contours of community PD there are in Africa. But, before that, the study looks at the nature of ISD in Africa. The perspective on ISD in this study is social (Hirschheim, Klein & Newman, 1991; Newman & Robey, 1992). A social perspective entails how stakeholders share ideas and information, coordinate, manage resources and resolve conflicts in designing, developing, using and evaluating an IS artefact (Sawyer et al., 2010).

## **2.2 Information Systems Development in Africa**

Following the preceding definitions of IS and ISD, the focus of this section is on the social perspectives on ISD in Africa. In particular, the focus of the study is on the *participative* role of community organisations during the *design and development of an IS*. Instead of looking at the technical aspects of systems development, the study concentrates on the issues around community organisations, in relation to other stakeholders, in the ISD change process in

Africa. The issues include the general assumptions, principles and elements of community participation in the ISD change process in Africa.

The process of ISD in Africa is diverse and vast, due to multiple characteristics associated with the concepts underlying the phenomena in developing contexts (Mursu, Soriyan, Olufokunbi & Korpela, 2000). Part of the reason for the complexity is that the associate terms of ISD – IS and development – mean different things to different people. ISD work in Africa concerns: systems requirements analysis and baseline studies; product development life cycle; systems and applications development; behavioural aspects of systems development; cultural and political aspects of systems development; contextual and environmental aspects of systems development; ISD methodologies, approaches, principles, tools and techniques; modelling; and decision-making support systems. In addition, due to the advent of cheap smart phones and accessible Internet in Africa, there is a growing appetite of ISD-related work on: methodologies, platforms and tools on Web/Internet development; application and mobile development; and development of business and societal systems for social media, networks and leisure (e.g. games and play).

**Table 2.2: Studies on ISD as a universal phenomenon in Africa**

Article	ISD aspect	ISD practice-related approach/methodology	Theory
Soriyan, Korpela, Mursu & Kailou (1999)	Design, develop and adjust context-sensitive ISD methodology, e.g. "Made-in-Nigeria" ISD methodology	Systems development and AR methodology	Activity theory
Mursu et al. (2000)	Special requirements for ISD in Africa: <i>sustainability, affordability, socio-economic justification and community participation.</i>	Systems development methodology	Activity theory
Soriyan, Mursu, Adegaye & Korpela (2000)	Theoretical framework and research methodology to study ISD in Africa	Systems development methodology	Activity theory
Korpela, Soriyan & Olufokunbi (2000)	Activity analysis as a method for information systems development	Systems development methodology	Activity theory
Soriyan, Mursu, Akinde & Korpela (2001)	Theoretical framework and research methodology to study ISD in Africa	Systems development methodology	Activity theory
Korpela et al. (2002)	ISD as a real-life work activity in context: collective work (human) activity in ISD	AR Methodology	Activity & Network theory
Korpela et al.	IS Research and Development for	Systems development	Activity

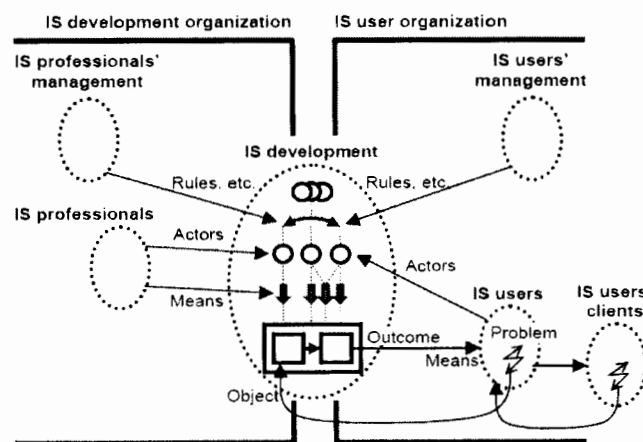
(2004)	emancipation	methodology	Theory
Pentikainen (2014)	Co-development methodology of work and Information Systems - 2001 to 2013	Activity-driven ISD Methodology	Activity Theory

The framework by Hirschheim et al. (1996) is useful in understanding the ISD process in Africa, although it restricts the organisation that has overlapping roles and cuts across all levels (Mursu, 2002). For that reason, the model misses the collective and contextual aspects of an organisation that are an integral part of ISD. To tackle the element of African contexts, Korpela, Mursu and Soriyan (2002) and colleagues provide a series of papers on what they believe is the ISD process in Africa (Table 2.2). They view ISD as a human activity that deals with systems analysis, design, development, implementation and management (Korpela et al., 2002).

The few rare studies, largely written by Korpela, Mursu and Soriyan are an attempt to look into the assumptions, principles and elements of ISD in Africa. The various studies aim to build and evaluate theory, methods and principles of the ISD process that particularly concern Africa. The studies in Table 2.2 shows elements of ISD phenomena in Africa that builds on mainstream theoretical views and methodologies of systems development such as Waterfall Model, Soft Systems Methodology, Multiview, Effective Technical and Human Implementation of Computer Systems (ETHICS), SCRUM, and Agile methodology. Informatics Development for Health in Africa (INDEHELA) project is an example of a holistic ISD approach for societal development (ISD4D) that different practitioners have participated to contribute to human development by collaboration. Drawing from the Activity theory, the authors claim that the ISD process in Africa is a collective effort of human beings within the contours of an organisation. This means that the activity of designing and developing an IS within a given setting involves efforts of different stakeholders. The work activity has to be done within cultural, political, socio-economic and environmental rules, standards, expectations and values. Mursu et al. (2000) provides an abstraction of the composition of such an ISD activity (Figure 2.2).

The ISD model in Figure 2.2 is a collective work activity that may begin with a problem to be solved or an urge to change. Actors may or may not direct their efforts to transform some object of work towards a joint and desired outcome. Interactions and actions of professionals

and users in ISD are guided but not restricted by organisational configurations such as social norms and cognition.



**Figure 2.2: Composition of ISD activity by Mursu et al. (2000, p. 4)**

The interactivities depicted in Figure 2.2 show that the ISD process in Africa can neither be reduced to simply technology nor a simple human activity. Rather, the process of ISD involves known and unknown aspects that bring opportunities and challenges to stakeholders. As a result, many papers on ISD problems in Africa relate in one form or another to:

- i. shortages and inadequacy of infrastructure, skilled personnel, electricity, visionary beneficiaries etc.;
- ii. insecurity of people, of food and even of property rights;
- iii. extremely unstable environments, a lawless society, rigid and unsupportive culture.

The intended recipient domain like in case of community organisation as a beneficiary, is generally regarded as key but the weak stakeholder group in ISD process (Boonstra & de Vries, 2008). Traditionally, developers and technology seemed to be at the centre of the ISD process. However, practitioners and scholars have been trying to incorporate people and organisations (society) into the ISD process. On the other hand, people and community organisations themselves self-facilitate their participation in the ISD process through critiquing, developing and using lenses, tools and techniques that are conscious of culture. The Open Development initiative is an example of appropriating technology and empowering people and organisations in Africa to participate (Smith & Elder 2010; Smith, Elder & Emdon, 2011). There is keenness to use people-oriented, ethnographic and social tools and techniques to inquire about the behaviour of people and the community organisation in ISD

in African contexts. According to Mursu et al. (2000, p. 1), ISD research and practice in developing countries is *"characterised by diversity, focusing on a wide area of objectives and methods"*. The study defines the ISD process, with a disposition towards African contexts, as the *"process by which some collective work [or social] activity is facilitated by new information-technological means through analysis, design, implementation, introduction and sustained support"* (Mursu et al., 2000, p. 1).

### **2.3 Community: notions and scope**

The term 'community', derived from Latin word *communitas*, can imply fellowship, participation, solidarity, sharing or union of purpose, interest or some characteristic. McMillan and Chavis (1986, as cited in Hooker, Shen & Ho, 2012, p. 160) outline a community as a group of individuals defined by: membership, influence, integration and fulfilment of needs and/or a shared emotional connection. More recently, Muniz and O'Guinn (2001) put forward, from a sociological perspective, a set of tenets of a community as follows:

- i. 'Consciousness of kind' - members are connected or similar in a certain way.
- ii. 'Presence of shared rituals and traditions'.
- iii. Moral responsibility toward the community.
- iv. 'Community' of physical or virtual/imaginary form.

What characterises a community in developing countries is the universality of characteristics, opportunities, requirements and problem domains (Gurstein, 2007). Invoking the term 'community' in developing countries ensures that one pays specific attention to being explicit to certain particularities of a social context. The functions and operations of a community organisation in a developing country may not be straightforward, as in the case of a business entity. The goal of business organisations is to maximise profit through efficiency and effectiveness. However, the goals of communities in developing countries are more diffuse and there are various requirements that come with being in a community in a developing country (Gurstein, 2007).

The term 'community organisation' is founded on different attributes from those of a firm or business organisation. The community organisations in question include any community defined by: a physical boundary, culture, shared and common feature and/or online, social

and network association. Thus, the concept of community is characterised from an identity and/or spatial perspective. In practice, terms such as 'the public', 'citizens', 'civic society', 'village' and 'users' loosely connote the 'community'. Although the study makes the community salient in the ISD process by dissociating the community way of practice from government, business and/or individual way of thinking and operating, some communities are made up of these other parties.

With a bias towards designing technologies for communities, Erete (2014) sum up checks and balances of a community as follows:

- i. Individualistic tendencies (interests, needs, expectations) – community participation improves if community activities are aligned to interests, needs and expectations of the individuals.
- ii. Group dimensions (type, size) – the general population is most likely to participate in community activities if members belong to a certain group or are obliged to belong. Community members participate if there is some personal connection to the group or they are influenced by the group. The size of a group has pros and cons on the behaviours of community members. People may join a community just because of mob psychology. Alternatively, if a small group of individuals dominates activities in the community, some people may lose interest, abandon the community or may simply lurk.
- iii. The social cohesion and social capital of the community – social cohesion, a key ingredient of a community, is the degree of social bonding, implying the amount of hope, trust, identity and sense of belonging. Social capital is the amount of resources available to a community through sharing, social connections and networking.

## **2.4 Community participation in ISD in Africa: tenets**

Community participation refers to the notion of incorporating stakeholders of a community organisation in the activities of a project or programme. The study conceptualises 'community participation in IS design and development' as a process of making intentional community organisation change by all stakeholders through sharing, learning and analysis of an IS artefact. If the study holds Korpela, Mursu, Soriyan and colleagues' claim that ISD is a collective activity, it follows then that community participation is vital to the ISD process in



Africa (Korpela et al., 2002). Traditionally, during an ISD process, weak organisational stakeholders such as users participated mostly in requirements specifications, testing and evaluation. With this operative definition of community participation in ISD, the researcher formulates a research thrust as follows.

**Research thrust 1:** What ISD processes and activities do practitioners implement and/or open up to community organisations in Africa?

One of the crucial aspects surrounding the ISD process in developing contexts is how participation of a community organisation is ignited, driven, structured, cultured and sustained (Erete, 2014). Organisational participation in the ISD process, like any other human activity in a developing context, is supposed to be ignited or driven by something. The people of a community organisation have to have a reason or motive to take part in the ISD activities.

Besides the immediate and apparent drive of material rewards, community organisations in Africa possess other fascinating motives to participate in the ISD change process. Community organisations at times participate in activities that give them freedom, openness, status, pleasure, economic benefit or satisfaction (König, R, 2013). Relevance is thus one of core community PD aspects in the ISD change process. Participation may be seen as a means by the practitioners to acquire organisational intelligences to develop a useful system and to incentivise social learning and intended use (Lyytinen & Robey, 1999). Also, participation of community organisations is a way of changing attitudes and improving commitment and capacity to learn, own and to control the ISD change process responsibly.

It is imperative to involve all stakeholders in the ISD process to formulate, design, develop, implement and evaluate IS solution spaces and build up knowledge collectively with practitioners. At least in theory, those once excluded have to be included. The public or civic have to contribute through: (1) deliberating on the choices, decisions and designs of projects that are supposed to solve their problem domain; and (2) direct development, management and support of systems such as projects under the free and open source, and social exchange/informatics banners. Bergvall-Kåreborn and Stahlbrost (2008) cluster the benefits and motives of community participation into three themes. They classify economic motive as concerning pragmatic derivable benefits. The motive of ethics involves the democracy and morality of trying to incorporate ideas of everyone. Lastly, the theoretical motive caters for



the quest for knowledge by researchers that is neither driven by gain nor morality. Within the field of Information and Communication Technology for Development (ICT4D), some interesting works of Heeks (2010) and Avgerou (2010) testify to a strong view that participation is useful in transforming developing countries. Our broad interest consequently is to comprehend the following:

**Research thrust 2:** How is the relationship between organisational participation and social development outcomes conceptualised and operationalised by IS practitioners/researchers?

## **2.5 Participation and participatory design in IS**

### **2.5.1 The general nature of participation in IS**

Participation is defined broadly due to the multiple and complex terms associated with it. To begin with, participation has various meanings, types and degrees assigned to it by different people and organisations. Arnstein's (1969) and Choguill's (1996) ladders of participation and Lindsay's (2003) pyramid of user-led design are examples of categorisation of different forms, types and/or degrees of participation. The ladders or pyramid of participation depict low-end non-participation and high-end full/genuine participation. Between the two extremes there are different classes of increased (decreased) participation from the non-participation (full) end.

In literature, terms such as involvement, engagement, collaboration, cooperation and co-creation are often used, confused and/or misused with the term participation. There have been efforts to clarify participation and its variants. The Management Information Systems Quarterly (MISQ) series on participation by Barki and Hartwick, for instance, outlines the meanings, linkages and differences between user involvement and user participation (Hartwick & Barki, 1994; Barki & Hartwick, 1989, 1994). Wagner and Picoli (2007) clarify user engagement as an enhancement of user participation. Discourses in Computer Supported Cooperative Work (CSCW), Participatory Design (PD) and Human Computer Interactions (HCI), suggest that the term 'participation' evokes similar connotations as cooperation, collaboration, co-creation and interaction.

Nowadays, organisations and individuals are devising new terms regarding participation, on prominent platforms such as Twitter, Blogs, YouTube, Facebook and Wikipedia. König (2013) coins the term 'lay participation' to refer to participation of lay people in Wikipedia. A paper by the Organisation for Economic Co-operation and Development (OECD, 2007) on Web 2.0, Wikis and social networking expands on the terms 'participative web' and 'user-created content' to imply interactive web services that enable users to contribute to the creation and use of Internet applications. By linking associated terms of community to participation, the phenomenon of community participation may be distilled in IS-related studies on:

- 'public participation' (e.g. public participation in Geographic Information Systems [GIS]),
- 'citizen participation' (e.g. citizen participation in e-government or e-empowerment),
- 'civic participation' (e.g. civic participation in cyberculture society, digital politics, e-democracy, civic software),
- 'user participation' (e.g. user participation in Web 2.0, Wikis, IS design, systems development, user-created content and/or social media, networks, exchange, computing), and
- other variations of participation such as involvement, engagement, collaboration, interaction and co-creation.

In many cases, the notions of participation, community and even ISD lack clear and precise clarity and differentiation, and their usage is usually based on different discernments. Such differences entail some critical implications (intended and unintended) for individuals, groups and society. From an academic standpoint, the lack of clarity and inconsistency in usage of terms may lead to ontological and epistemological deficiencies or vice versa. In order to look into these possible deficiencies and differences, the researcher formulates a research thrust to understand the nature of community participation in IS:

**Research thrust 3:** How do researchers/practitioners hypothesise the notions of participation and community organisation in their ISD work in Africa, if there are any?

The aim of the review study is to examine the way and the basis upon which practitioners clarify participation and related notions.

### 2.5.2 The basics of participatory design

Participatory design is an approach of designing a system by involving stakeholders in the design process, to ensure that the produced product is relevant. Participatory design tradition has its roots in the Scandinavian era of the 1970s when workplaces were characterised by trade unions movements (Bødker 1996). Participatory design, then known as 'cooperative design', was introduced to achieve equality and democracy at work, since workers and managers had separate discussion sessions about systems to be used by both parties (Kensing & Blomberg, 1998). The Scandinavian PD methodology of active collaboration between designers and users was used in North American contexts (Schuler & Namioka, 1993). Since then, the PD approach is spread in fields such as product design, urban design, planning, architecture and medicine, and diverse cultures of South America, Asia (e.g. Yasuoka & Sakurai, 2012), India (e.g. Puri, Byrne, Nhampossa & Quraishi, 2004) and Africa (e.g. Winschiers-Theophilus, 2009). Muller, Wildman and White (1993) provide an early taxonomy on PD practices in Europe and later in the North Americas. Drawing from such historical trajectories, PD is a way of creating eco-systems that are responsive and appropriate to the parties' cultural and practical needs.

The assumption is that every participant has expertise and knowledge that may be useful to the systems design in a given context. The parties get expertise and knowledge from experience, education and from being in close contact with the context in question. The core idea of the PD approach is that people should have a chance to influence a decision or event that will affect them. In PD, it is accordingly democratic and important to actively collaborate with all concerned parties, e.g. users and designers; workers and managers; community members and project managers. However, the attempts to create an appropriate environment to design systems and products have been a challenge. Different contexts have been occupied by different circumstances, making adapting PD solutions from one context to another challenging in reality (Puri et al., 2004; Winschiers, 2006).

### 2.5.3 Previous review studies on participation in ISD

There are similar literature review studies on participation in ISD. Ives and Olson's (1984) study evaluates the relationship between user involvement and system success. They define user involvement as participation of representative user-group in systems design and

development processes. Notably, Ives and Olson (1984) find that eight of the 22 studies reviewed claim to have a positive correlation between participation and system success. Cavaye's (1995) study revisits the link between user participation and system success. Her review of 19 empirical studies on participation shows a similar result, 36% of the studies having a positive correlation between participation and system success. Half of the studies show inconclusive results and three studies reveal negative correlation. Cavaye (1995) notes that one of the reasons for the inconsistency and non-cumulative results are the nebulous nature of the term 'participation'.

Following the findings of the past reviews, Hwang and Thorn (1999) carry a meta-analytic review on user engagement with the aim of gaining a better understanding of the reported inconsistencies and controversies. Hwang and Thorn (1999) conceptualise user engagement as *either* user involvement *or* user participation *or* both. They define user involvement as the mental or psychological state of users, and user participation as the observable behaviour or acts of users towards the design and development of a system. Hwang and Thorn (1999) find that user involvement has a considerable link to system success, while user participation has weak correlation to system success. They conclude that, although user involvement and user participation are beneficent to system success, the *extent* of derivable benefits depends on how the term is defined and exercised. He and King's (2008) synthesis of 82 studies, in a meta-analytic review fashion, reveal minimal to moderate participation benefits to ISD. Similar to Hwang and Thorn's (1999) results, He and King (2008) find that participation has a comparatively stronger impact on attitudinal/psychological outcomes (i.e. aspects defined previously as involvement) and a weaker link on productivity outcomes.

Dearden and Rizvi (2008) offer a reasonably different and interesting comparative review for developing organisations. Dearden and Rizvi's (2008) review compares participatory interactive system design with participatory development. In a way, their review is a comprehensive rundown of almost all constituents of participation for development: those of historical and current rationale; processes and language hard and soft skills-set; and activity. In conclusion, Dearden and Rizvi (2008) assert that relationships due to integrating participative design with development efforts are so complex that there is a need for careful reflection on the developmental quality and participation approach to be embraced.

Maail (2011) reviews participation in ICT4D in developing countries. He defines ICT4D as a subset of IS and HCI, thus trying to link past reviews on participation in IS and HCI with participation in ICT4D in developing countries. Drawing from Avgerou (2009, 2010), Maail (2011) claims that theory building in ICT4D studies on participation in ISD follows two discourses, namely: 1) transfer and diffusion, and 2) social embeddedness. The transfer and diffusion perspective entails the diffusion of IS knowledge transferred from developed countries. Proponents of transfer and diffusion views claim that knowledge is independent of the social settings and, if suitably adapted, it has to remain intact (Avgerou, 2009). The viewpoint from social embeddedness is that IS knowledge and innovations in developing countries is closely linked to social settings. Maail (2011) categorises the related literature into a quadruple matrix: ICT4D areas of studies (*IS and HCI*) on the vertical against presumed discourses of theory building (*transfer and diffusion and social embeddedness*) on the horizontal. Maail's (2011) review of the relationships between participation and the success of ICT4D projects reaffirms previous reviews' complexities and controversies. Admittedly, certain research and practice aspects ought to be addressed in order to amply understand and exercise PD.

The first four reviews by Ives and Olson (1984), Cavaye (1995), Hwang and Thorn (1999) and He and King, (2008) are of least concern to African contexts. These four reviews are pro-western contexts with the main emphasis *user* participation in 'western work' systems development, use and success. The last two reviews by Dearden and Rizvi (2008) and Maali (2011) somewhat challenge earlier studies by looking into non-work issues of developing environments. However, the present study is done in the belief that there is room to get a deeper understanding of the PD concept by use of a rigorous methodology and a representative sample of studies on participation in Africa.

**Table 2.3: Similar Review Studies on Participation in ISD**

Article	Information System Development Theme	Review Genre
Ives and Olson (1984)	User involvement on system success	Narrative
Cavaye (1995)	User participation in system development	Narrative
Hwang and Thorn (1999)	User engagement on system success	Meta-analysis
He and King (2008)	User participation in Information System development	Meta-analysis
Dearden and Rizvi (2008)	Participatory design <i>vis-à-vis</i> participatory development	Narrative
Maail (2011)	User participation on ICT4D system success	Narrative

In sum, previous reviews show that the research and practice of participation in ISD to achieve organisational activity and development is complex and debatable. Table 2.3 summarises the ISD theme and review genre of previous review studies on participation. One formulation of this intricacy is that social context strongly shapes social action and, in turn, social action shapes the context (King et al., 1994). Developing communities thus have to ascertain how participation serves in designing and developing an IS artefact within a given context. To this end, this review aims to validate, nullify or clarify relational aspects between community participation and organisational development, specifically in African settings. Therefore, the present study undertakes to answer the question:

**Research thrust 4:** What are the taken-for-granted assumptions, similarities, differences and contentions between previous review studies and the present study of PD in ISD in African countries?

## **2.6 Summary of overview of community participatory design in ISD**

This chapter draws from worldwide perspectives to delineate distinct elements that constitute the ISD change process and community PD. The specific context of interest is Africa. An Information System (IS) is simply defined as a social system including some technological elements. The ISD change process is defined as a collective activity of different actors to solve a problem domain with some technological facility. It is expected that during the ISD process, professionals, sponsors and users have to participate within set organisational boundaries. While pure software engineering and product development focus mainly on software production, the focus of this study is the social perspectives of the ISD process. Data attest that the element of organisational participation in ISD is salient to the development of organisations. The chapter also outlines a community organisation as a physical or virtual group of people working towards a common feature or shared goal. The study views community participation in ISD to mean acts of trying to incorporate all members of a community organisation in the process and activities of IS design and development. Most of the review studies similar to the present one focus on different settings. Four research thrusts that are compelling yet which receive less research attention are studied. The aim of the study is to look at the research thrusts through reviewing and analysis of literature about community PD in ISD in Africa.

The next chapter provides a theoretical guide to look into the research thrusts summarised in Table 2.4.

**Table 2.4: Summary of research thrusts**

No.	Research thrust description
i.	What ISD processes and activities do practitioners practise and/or open up to in community organisations in Africa?
ii.	How is the relationship between organisational participation and social development outcomes conceptualised and operationalised by IS practitioners/researchers?
iii.	How do researchers/practitioners hypothesise notions of participation and community organisation in their ISD work in Africa, if there are any?
iv.	What are the taken-for-granted assumptions, similarities, differences and contentions between previous review studies and the present study of PD in ISD in African countries?

### 3. Design Science conceptual framework

The previous chapter reviewed literature about the key terms of topic under investigation and provided an overview of past studies similar to the present review study. The present study builds on arguments in the past reviews and uses Design Science (DS) as a conceptual framework of choice. The object of this chapter is not to provide an exhaustive analysis of the DS, but, rather, an exploration in sufficient depth to make visible some salient features contributing to the framework. In particular, the study employs DS perspectives by McKay et al. (2012) to identify, organise and analyse different aspects of the community participation topic in developing countries. DS concerns utility, effectiveness and efficiency in improving human conditions by learning through building (Winter, 2008). The DS lens entails the critical search for knowledge. In particular, DS sheds light on the contextual search for utility, i.e. how stakeholders determine utility and how settings determine the workability of something. In other words, the intention of looking through the DS lens is to improve/solve problematic situations. DS is used as a lens to look into previous literature to understand participation of an organisation striving to solve problems by building, applying and evaluating the designed IS artefact (Hevner et al., 2004). In this study DS is taken as *“a set of synthetic and analytical techniques and perspectives”* to review previous studies on participation (Vaishnavi & Kuechler, 2004).

#### 3.1 Critical research philosophy: a credible approach to Design Science

The research and practice of enacting participatory behaviour and organisational development through learning and sharing in the IS discipline predominantly follow positivism (Goles & Hirschheim, 2000). Likewise, the design of DS-oriented work in the IS field is often associated with positivism (Levy & Hirschheim, 2012; livari, 2007), the AR approach and other additional perspectives such as pragmatism (Goldkuhl, 2008). To illustrate, Lindgren, Henfridsson and Schultze (2004) use AR to develop and test design principles for competence management systems. Järvinen (2007) argues for the view that the DS approach is similar to Action Research. Sein et al. (2011) who merge Design principles and AR to frame the Action Design Research model. Hovorka (2009) uses pragmatism as an underlying philosophy in DS in an attempt to sway IS scholarship to use and accept multiplicity in research perspectives.



However, this study is about designing for emancipation hence it follows on the critical thinking in evaluating and reflecting on design-oriented work (Myers & Klein, 2011; Venable, 2011).

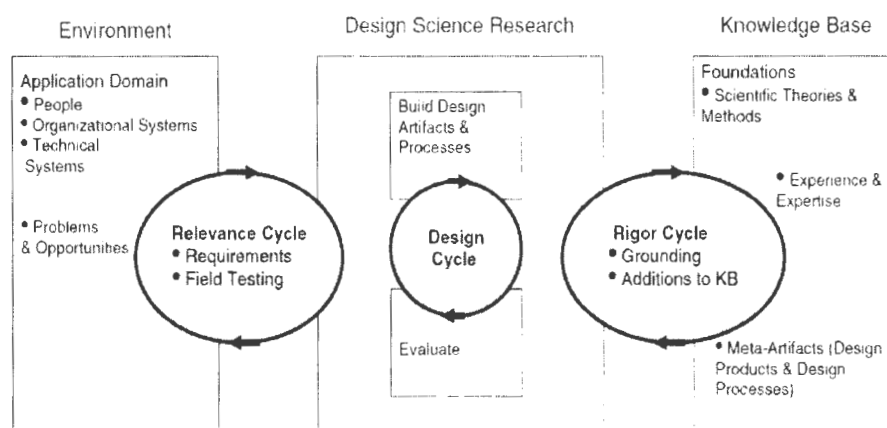
The present study aims to understand the social world by reviewing PD studies on civil society i.e. the works on designing objects of emancipation. Designing objects of emancipation entails acts and performances of attempting to address inequalities and exclusion through PD. Critical philosophy is therefore used to examine the manifestations of emancipatory values that guide the artificial construction of social reality through technology. Carlsson (2003; 2004; 2005) and Dobson (2001) elicit critical realism as suitable philosophical underpinning for IS DS research and for framing IS DS in ISD. Venable (2011) argues for use of critical research as a better paradigm than positivist and interpretive research to investigate business aspects other than profit. The reason being that critical philosophy makes salient the examination of values and justice issues in emancipatory work. Myers and Klein (2011) and Venable (2011) argue that critical research philosophy is credible to assess values positions in designing spaces of emancipation (i.e. by participative practices in ISD). Stahl (2008) argues for using critical views in looking at the ethical and moral values of IS design. Venable (2009) uses critical philosophy to look into issues of stakeholder alienation, status quo and emancipation involved in system design.

### **3.2 The overarching principles of Design Science in IS**

It is generally accepted that design-oriented research and practice concern problem-solving through notions of construction and functionality. Engineering and architecture scholars (Au, 2001) believe DS emanates from the Sciences of the Artificial (Simon, 1996, originally published in 1969). Artificial, coming from the word 'artefact', connotes "*any object made by humans with a view to subsequent use*" (Macquarie Concise Dictionary [1998] as cited by McKay & Marshall, 2005, p. 2). Inherently, artefacts are *created by humans* to meet a certain *utility*. Such ideological beginnings have had an influence on DS in IS field. For instance, Power (2004) suggests that DS research is "*about building innovative technology systems*". March and Smith (1995, p. 253) say "*DS attempts to create things*". Following on this permeating view of DS being about 'things' or artefacts, Hevner et al. (2004), authors of a *MISQ* seminal paper on DS in IS research, assert that constructs, models, methods and instantiations are

constituents of an artefact. Moreover, Hevner et al. (2004) openly declare that they “*do not include people or elements of organizations in [their] definition [of IS artefact] . . . artefacts constructed in DS research are rarely full-grown Information Systems that are used in practice*”. However, McKay et al. (2012) call for a different viewpoint of DS and artefacts.

McKay et al. (2012) critique the conception of DS in IS by Hevner et al. (2004) as too narrow, relative to how DS is conceptualised in other disciplines. Nevertheless, given that the work of Hevner and colleagues is widely proclaimed within the IS design community (Kuechler & Vaishnavi, 2008), McKay et al. (2012) label it mainstream DS in IS. The main focus of mainstream DS, comprising of works by Nunamaker et al. (1991), Walls, Widmeyer and El Sawy, 1992; 2004), March and Smith (1995), Markus, Majchrzak and Gasser, (2002), Hevner et al. (2004) and many others, is the construction of an artefact. It follows that at times it is referred to as construction-centred DS. Regardless of the various interpretations and propositions of DS in IS discipline (Baskerville, 2008; Winter, 2008), DS is about structuring and developing ‘something’ to solve a problem domain.



**Figure 3.1: Design Science Research Cycles by Hevner (2007, p. 88)**

There are various arguments on what constitute DS frames in literature. However, this study focuses mainly on the most cited work of Hevner and associated colleagues to highlight some underlying principles of the present DS framework. Design Science is an integrative model between the environment and the knowledge base (Figure 3.1). Design Science is a frame of reference for change – through using knowledge to facilitate the creation, manipulation and modification of artefacts within an environment (Hevner et al., 2004; Vaishnavi & Kuechler, 2004). Design Science frames illuminate problems and opportunities within the environment and keep the knowledge-base in check with experience, expertise and scientific know-how.

Hevner (2007) portrays the environment, knowledge base and the DS as interlinked by three cycles: the relevance, design and rigor cycles (Figure 3.1).

The *relevance cycle* deals with the context and the IS research domain that enquires about contextual needs, expectations and field-testing. The context is the environment in question, in which the people and systems are situated and the problems and opportunities are localised. The relevance cycle looks into the appropriateness of the system by checking, testing and balancing what the context expects against the designed/built artefacts. As depicted in Figure 3.1, the *design cycle* is about assessing and evaluating artefacts, theories, processes, tools and techniques in relation to the context and knowledge base (Iivari, 2007). The design cycle is at the centre of knowledge building through DS research, practice and checking if the system is in tune with the context. The *rigour cycle* concerns grounding data from research and enquiries with existing knowledge and expertise. The rigor cycle interrogates the validity of claims and assumptions with theories, expertise and meta-analysis, in an attempt to get closer to valid and complete knowledge.

In summary, the operative principles underlying any DS framing are as follows. Perspectives on DS bridge the theoretical world (knowledge base) and the environment. DS framing starts with an awareness of a problem domain or an opportunity in a given environment. The consciousness of a problem (opportunity), emanating from experience, expertise or necessity, urges parties within an environment to set up a *problem-solving procedure*. A typical problem-solving procedure entails organising parties to devise, plan, construct, implement and evaluate a solution space (designed artefact). The parties are diverse and include, (but are limited to), indigenous people, sponsors, experts and society at large. With regard to the environment, DS thinking aims for change, transformation or improvement. To knowledge base, DS views point towards the production, critiquing and maturing of know-how by learning through building. The study takes DS as a lens to illuminate the participative process of parties that intend to solve problems, take advantage of an opportunity or contribute well-informed knowledge. DS is neither restricted to things of physical form, nor is it a linear lens. In essence, DS is an integrative and iterative lens involving the synthesis and analysis of elements of material and cognitive form into a coherent and complete whole.

### 3.3 The elements of the Design Science model by McKay et al. (2012)

McKay, Marshall and Hirschheim (2012) put forward an alternative perspective to Hevner et al.'s (2004) DS views. More precisely, the model by McKay et al. (2012) is built from the work done in mainstream IS design community and design perspectives from other disciplines. Adding to the traditional conceptualisation and actualisation of design construct (i.e. *material and artificial* objects argued by Hevner and colleagues), McKay et al. (2012) propose inclusion of the *immaterial* ideals to cater for a broader spectrum of IS research and practice. These immaterial notions of design include “*systems, processes, organizations, user experiences, on-going interactions, relationships and the situated meaning of things*” (McKay et al., 2012, p. 125). On top of traditional conceptualisation of *design construct as a product* and *design as a process or action*, McKay et al. (2012) advocate additional conceptions of design such as: intention; communication; experience; value; planning (modelling and representation); service and/or professional practice (Table 3.1). In a way, the alternative view on DS incorporates the human-centred perspective of DS, hence it expands the construction-centred perspective to include richer, unrestricted visions and broad bodies of knowledge that might be applicable in the extant IS domain. This renewed view of DS, supported by Carlsson (2007); McKay and Marshall (2007); Niehaves (2007a; 2007 b); Avital, Boland and Lyytinen (2009), promotes pluralistic perspectives surrounding DS thinking. McKay et al. (2012) and fellow colleagues thus articulate possible views of – and insights on – the ‘reality’ in developing settings (El Sawy, 2003).

**Table 3.1: Material and immaterial aspects of Design Science**

Description of aspect	Elements of DS: design as a ....
Traditional design forms associated with materiality	Product, process or action
Proposed design forms associated with immateriality	Intention, communication, experience, value, planning (modelling and representation), service, professional practice

**Source: McKay et al. (2012)**

The model by Krippendorff (1996, p. 14) of form and meanings, shown below in Figure 3.2, is provided to make salient the elements upon which the DS model by McKay et al. (2012) is based. The model by Krippendorff (1996) depicts the contextualisation of meaning and form,

revealing that an attempt to formulate or develop an artefact not only involves the *forms* (and functions) that designers create (see Figure 3.2). Rather, it also incorporates the sense-making of intended beneficiaries, the contribution of the locals in making *meaning* (knowledge) of the artefact in context and the complex circular process of constructing meaningful relationships between objects and contexts (Krippendorff, 1996).

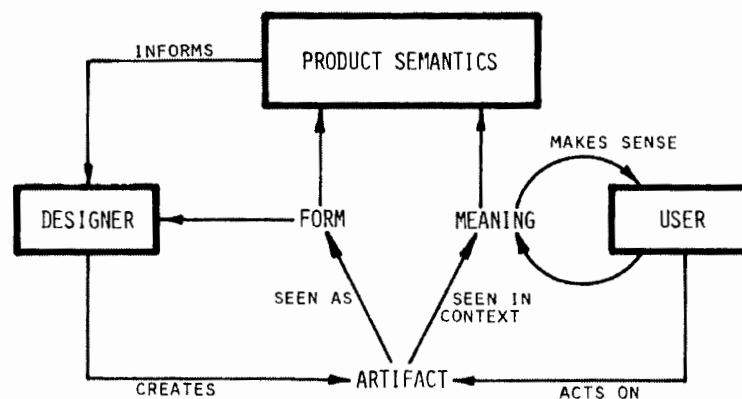


Figure 3.2: Form and meanings in context by Krippendorff (1996, p. 15)

McKay et al. (2012), drawing from Krippendorff (1996) and Galle (1999), posit a model (Figure 3.3) underscoring the relevance (context), rigour (body of knowledge) and design cycles as components of IS DS. According to McKay et al. (2012), the model in Figure 3.3 concerns human-centred or alternative perspectives of DS. As discussed earlier, the human-centred DS model by McKay et al. (2012) builds on ideals of Hevner et al. (2004) depicted in Figure 3.1. More importantly, the human-centred design perspective attempts to incorporate the immaterial or non-physical facets of DS that may be central to interactions between users (community organisation), artefacts (ISD services and products), and designers (practitioners, researchers, developers) within a given context. Figure 1.1, in Chapter 1, depicts an abstract of the interactivity between community organisation, artefact and practitioners. The researcher superimposes community PD abstract, depicted in Figure 1.1, onto the detailed design aspects in Figure 3.2 and 3.3. The study thus uses design perspectives to illuminate the practice of community participation in ISD. The next section reconciles DS elements and PD ideals.

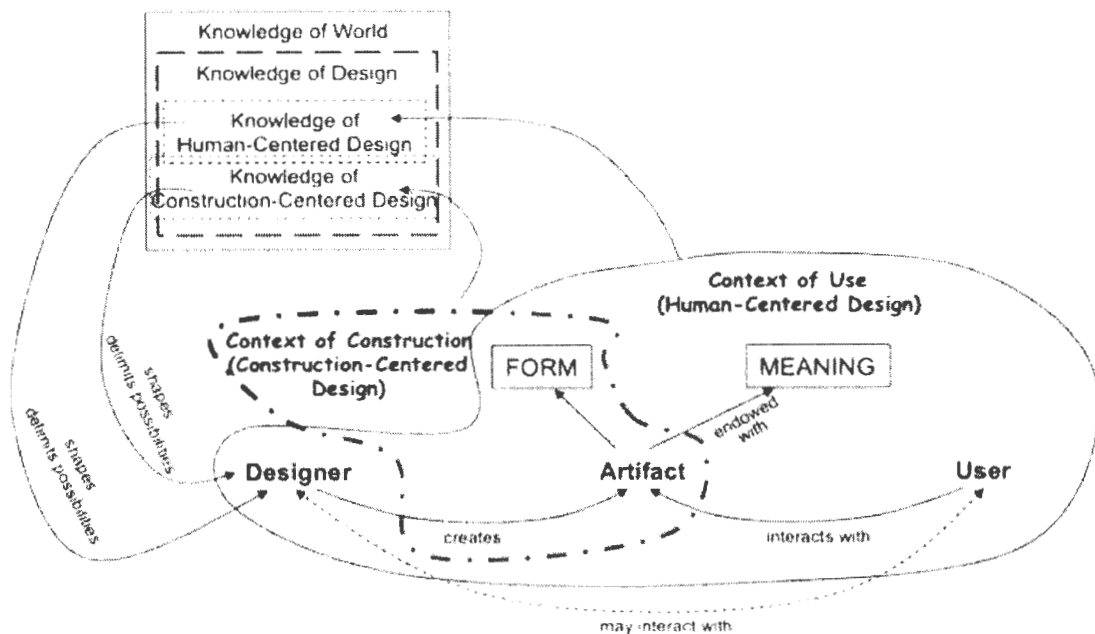


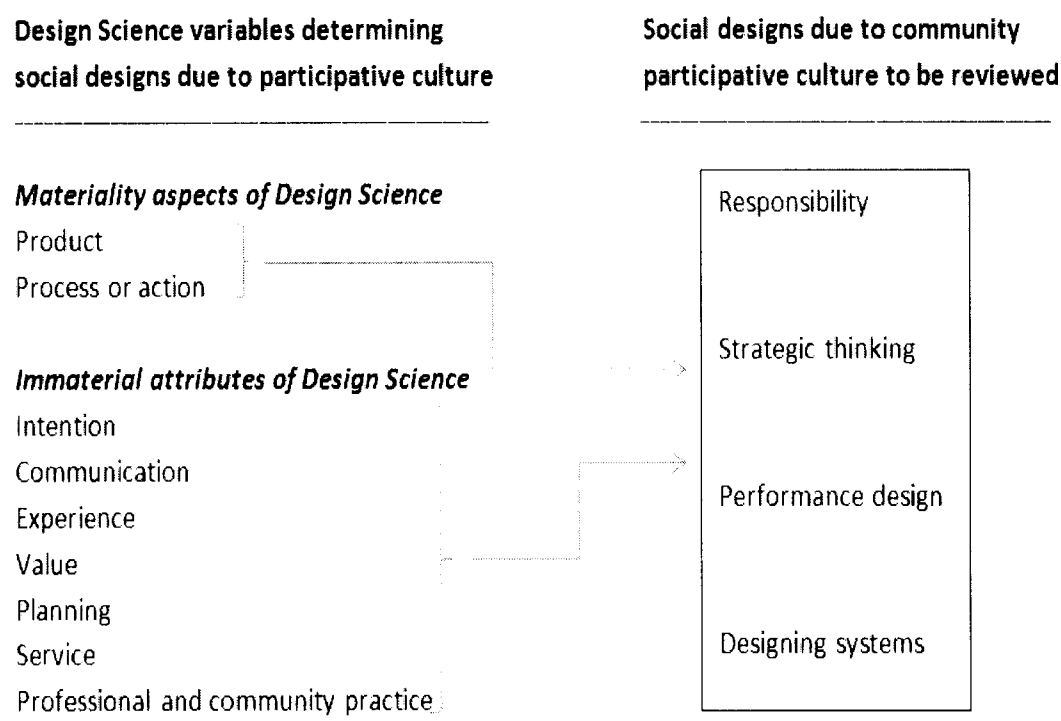
Figure 3.3: Components of IS Design Science as posited by McKay et al. (2012, p. 135)

### 3.4 A Design Science frame to review social designs due to community participation

The study has thus far presented the generic DS frames of an organisation, based on the work of Henver et al. (2004) and Mackay et al. (2012). A DS frame is used to enquire on the social designs due to community participation. This study reviews texts to understand the participative forms of research that rest on the social designs of IS (also known as socio-technical designs). Social design emphasise the meshing of behavioural factors with interactive design and experiences in solving a complex social problem, using technology. The social designs due to the culture of community participation include the design and use of IS artefacts to support reshaping of social structures, social boundaries, social relations and social norms (Sawyer et al., 2010).

The arrows in Figure 3.4 signify the material and immaterial design attributes of the socio-technical designs due to participation. Social designs are rooted in behaviour, social cognition and interactive design. Social designs underlie the responsibilities, performance in design, strategic thinking and actions afforded (inhibited) by different forms of community participation culture.

In community participation, the assumption is that creative and innovative designs arise in social contexts in which experience and interactions with other people and the artefact embody synergic knowledge on the ISD process. The key to this analysis of socio-technical design due to community participation is the variances (i.e. deviations from the standard and norms) in the responsibilities and strategic thinking of actors and the performance designs and overall designing of systems (Figure 3.4).



such as whether to focus on capabilities, transferring skills and ownership or on income and handouts. The study looks at strategic thinking from a critical perspective to understand the socio-technical issues of competitiveness, alignment and efficacy due to PD.

For community participation to shape products and create shared social reality, there has to be *performance in the design*. Performance-based design starts with the discussion between practitioners and intended users about appropriate performance goals. Under performance in design due to participation, the study seeks to understand if the design performs or depicts as expected. This study examines performance in design by trying to find the nature of social designs relating to accomplishment of tasks, improved efficiency and effectiveness enabled by community participative designs. The motive is to derive a benchmark from literature to prescribe desired results and performance in use. Performance goals may be expressed as a level or standard of acceptable professional and community organisational conduct and behaviour in PD.

The overall dimension that ties up the social designs due to community participation is the *designing of systems* of communication, product development and organising the environment. In designing systems of participative culture, the study is interested in the levels with which actors, and the environment as a whole, afford (inhibit) awareness, visibility, responsibility and accountability during interactions and co-evolution. Given that designing of social systems is a continuous purposeful and collective human activity to create the 'ideal' future, the researcher assesses the standard at which actors construct and reconstruct systems across the design cycle.

The constellations of DS that community PD in ISD aims to attain, which form part of the criteria of the present review study, are as follows:

- i. The *context or environment* is core in clarifying obscurity in interests, values, expectations or capacities, and in reducing mismatch between provision of solution conjectures and requirements.
- ii. The sharpened prominence of the *intended beneficiaries* – community organisation – contributes ideas not only to the relevance cycle but also transitively to the rigour cycle.



- iii. The systematic search and acquisition of knowledge fosters the embodiment of man-made 'things'; and raises a positive attitude. This is not in a once-off agenda, but rather, it involves long-time commitment, multiple trials which involve learning and *oscillating* between sharing of ideas among key parties and provision of solution conjectures.

The nature of the social designs due to participative culture, comprising of responsibilities, strategic thinking, performance in design and designing of systems, depends on the material and immaterial dimensions of design. To find out the levels of socio-technical designs due to participation, the researcher also identified the materiality and immateriality elements of design employed in respective studies.

### **3.5 Summary of Design Science conceptual framework**

The Design Science (DS) conceptual framework offers credible principles to guide the assessment and analysis of the social phenomenon of community PD in African contexts. . Participatory Design (PD) is about the stakeholders' acts and behaviours of conceiving, building and evaluating systems and objects. The principle of devising of artefacts to solve a problem and represent art, culture and performance inherent in DS makes it credible approach to PD. The researcher argues from literature that the DS frame is appropriate to illuminate the community PD topic. McKay et al. (2012) postulate the encompassing design concepts as consisting of materiality aspects (product, process and actions) and immaterial aspects (intention, communication, experience, value, planning, service and practice). The researcher used the design perspectives by McKay et al. (2012) to examine the socio-technical designs that arise as a result of a given community participation. This chapter has put forward broad dimensions of social designs due to community participation. The social designs are meant to guide the present review focus on the actors' responsibilities and strategic thinking and actions, performance in the design and designing of the whole system. Design Science research can offer new insights regarding community PD in African settings.

The next chapter presents the research methodology followed in searching, selecting and analysing the review studies.

## 4. Research methodology

The previous chapter presented DS as the conceptual framework of the study. This chapter discusses the research philosophy, data sources and the procedures used to identify and select relevant literature. The aims of unpacking the underpinning philosophy are to: conceptually structure or design the review study; position the description of the topic; and explicate the normative stance of the review study. This chapter outlines *how* the literature was found, *where* literature was searched and the keywords/searchwords combinations used. The research methodology chapter links with preceding discussions that provide the basis for using certain keywords.

### 4.1 Critical research philosophy

Following the open-ended trajectories of DS, the study adopts a critical thinking stance as an underpinning philosophy of this review study (Bhaskar, 1989). Critical research philosophy refers to the belief that people are able to transform their circumstances, although their capacity is restricted by economic, historical, political and cultural settings (Cecez-Kecmanovic, 2001). A critical perspective provides a philosophy to critically probe the community issues relevant to any system under study. There are various *critical* ontological, epistemological, and ethical positions scholars may adopt in IS such as critical realism (Mingers, 2004), critical relativism, critical social theory (Ngwenyama & Lee, 1997) and a more general position of critical thinking. However, the foreword 'critical' in critical philosophy is generally suggestive of a:

*critical attitude, self-reflection, awareness of hidden presuppositions, and disclosure of assumptions of various perspectives ... liberation from repression, emancipation, concern with equality and justice, fulfilment, empowerment, absence of false consciousness and alienation, (Tsoukas, 1992, p. 639).*

Following this understanding of critical thinking, Howcroft and Trauth (2005) provide five themes of general critical research and practice as follows.

- i. Emancipation – evokes the notion of striving to liberate (transform) oneself from a state of alienation and domination.
- ii. Critiquing the tradition – encourages critical practitioners to challenge the status quo, taken-for-granted assumptions and established ideologies.

- iii. Non-performative intent – rejects the view that action is steered by economic benefits only (means-end motives), without taking into consideration the social relations and their associated aspects.
- iv. Critiquing of technological determinism – intends to disrupt the false logic that technology, as a given, leads to socio-economic development.
- v. Reflexivity – makes prominent the methodological uniqueness between critical and other mainstream IS approaches. Reflexivity concerns the role of the researcher (practitioner) as a producer of knowledge (praxis) and in mediating and negotiations.

The study assumes that the intentional actions and behaviours of community organisations participating in ISD activities are driven by beliefs and values. The three claims on beliefs and values derived from the general understanding of critical reasoning are as follows:

*Philosophical claim 1:* The view that fairness, equality and mutual understanding, and emancipation are usually desirable is itself a value-laden position. The argument is that such aspects are attainable through PD.

*Philosophical claim 2:* Design Science concerns structuring and developing of individual, organisational and environments systems towards preferable directions. Gabel (1979) asserts that values and beliefs determine these preferred directions i.e. 'where we want to go'. Accordingly, this study reviews community participation as a tool driven by values and beliefs that can be used to design and enact material and immaterial aspects ideal for social life.

*Philosophical claim 3:* The thinking and trying to understand of human beings and their existence is more complex than what one does, or possibly, knows (Bhaskar, 1989). This study argues that there are diverse views on community PD that result in contentions on the emic/etic, objectivity/subjectivity, universality/particularity in the critical philosophy of designing spaces of emancipation (Sabiescu, David, Van Zyl & Cantoni, 2014). The nature of reality may be subjective, given that some aspects to be investigated have no form or substance, such as metaphysical forces; qualitative diversity; and change of seemingly emergent things and properties (Bhaskar, 2008). As Burrell and Toyama (2009) note, the researcher does not claim perfect accuracy, since this is not achievable due to inherent human bias. Rather, the study strives towards minimal bias in searching and selecting studies and greater accuracy in interpretation and analysis.

Following on critical thinking and reflection, the study aims to investigate how: (1) researchers/practitioners affect and influence the social phenomena and technological systems that they are enquiring about/exerting (Hammersley, 1992; Ngwenyama & Lee, 1997); (2) shared social reality is produced and reproduced by ongoing social interactions among individuals, organisations and the context (Orlikowski & Baroudi, 1991). The intention is to view DS principles through the lens of critical philosophy to get *insight on* and *critique* the community PD topic, and hopefully contribute knowledge leading to *emancipation*, development and growth (Myers & Klein, 2011).

## 4.2 The systematic search for relevant literature

The systematic search process included identifying, locating and retrieving appropriate sets of literature. The systematic literature search, identification and retrieval process was as follows. The researcher searched for literature in recommended and high ranking IS publication locations and potential repositories for candidate studies on PD. The search was done in pertinent journal databases namely: ScienceDirect, EBSCO, Google, IEEE Xplore, Web of Science and The ACM Digital Library. The specific pertinent publications searched include: *MISQ*, *Information Systems Research*, *Journal of AIS*, *Journal of Information Technology*, *Journal of MIS*, *European Journal of Information Systems*, *Information Systems Journal (ISJ)* and *Journal of Strategic Information Systems*. These journals are among the high impact journal outlets in IS research and practice (Walstrom & Leonard, 2000; Mylonopoulos & Theoharakis, 2001). However, among all pertinent journals recommended by AIS only one relevant study was found in the ISJ. The search was therefore shifted towards locations that primarily publish papers on developing countries and participatory-related work. The publication list of ICT4D work by Heeks (2010) proved to be a useful source of relevant literature on community PD in African contexts. Some papers were found in peripheral publication locations that primarily focus on cooperation (CSCW), participation (Proceedings on PD) and interactions (Proceedings on HCI) (see Appendix B for full list).

The primary logical search strings used consist of query-term1 + query-term2: **query-term1** set includes ('community' or 'public' or 'citizen' or 'user') and **query-term2** set includes ('participation' or 'engagement' or 'involvement' or 'participatory design'). Other closely related keywords, which were used in place of query-term2 in the above search strings

included: co-creation, co-design, collaboration, co-operative design, openness and decentralisation. Following Webster and Watson's (2002) backward and forward search technique, the researcher also scanned references and citations of selected literature to identify any possible literature that may not have been found but were of interest to the topic in question.

To locate studies that relate to African and IS context, the search strings described above were appended with the string '... in ISD or ICT or IT or IS or ICT4D in Africa'. Table 4.1 shows the resultant complete search strings. Further, the respective African states were used in place of 'Africa' in the search string to identify the candidate studies tagged by specific country names. Examples of such search strings used were 'community participation in ISD in Namibia' and 'user engagement in ICT in Nigeria'.

**Table 4.1 List of primary search words**

<b>Prefix</b>	<b>Suffix of search string</b>
Community	Participation; engagement; involvement; PD in ISD/ICT/IT/IS/ICT4D in Africa
Public	Participation; engagement; involvement; PD in ISD/ICT/IT/IS/ICT4D in Africa
Citizen	Participation; engagement; involvement; PD in ISD/ICT/IT/IS/ICT4D in Africa
User	Participation; engagement; involvement; PD in ISD/ICT/IT/IS/ICT4D in Africa

### **4.3 The inclusion and exclusion criteria of related literature**

The following aspects, combined, constitute the primary selection criteria employed to determine studies eligible for inclusion and/or exclusion from the systematic review study. The eligibility criteria gave form to the scope and validity of the review as follows:

- The object of enquiry of the study was IS artefact or a dynamic 'associate' of IS practice, such as ICT, IT, technology, information, communication and networks in a community organisation in the African context.
- The context of prospective studies for the review was Africa. The circumstances (background, setting, environment and situation surrounding the impetus) of the candidate study had to explicitly concern Africa i.e. a community organisation, be it physical or virtual, of an African context.
- The keywords had to be situated in at least one or more of the following sections of the paper: title, abstract, keywords; or the body had to conclusively provide for the topic in question as one of the main discussant issues.

The basis for the selection criteria was relevance and acceptability of the phenomenon being discussed in the candidate article. To attain relevance and rigour, the researcher excluded studies that failed to report sufficient data on the topic under review, e.g. studies that only mentioned participation in passing. In selecting papers, the guiding principle was to identify, retrieve and retain studies that holistically dealt with the community PD topic in African contexts.

**Table 4.2: Publication repository distribution of review studies**

<b>Publication repository of review studies, 1996-2013</b>	<b>No. papers</b>	<b>Percent</b>
Information Technology for Development	15	16
ACM - Proceedings of the PD Conference	13	14
Information Technologies and International Development	10	10
Information Development	6	6
ACM - CHI	5	5
ACM - Proceedings of SAICSIT	5	5
ACM - ICEGOV	4	4
The African Journal of Information Systems	4	4
Information, Communication and Society	3	3
SA Journal of Information Management	2	2
ACM - ICEC	2	2
ACM - ICTD	2	2
ACM - OZCHI	2	2
IEEE Computer Society	2	2
Springer - Perspectives on Ubiquitous Computing	2	2
The Electronic Journal on Information Systems in Developing Countries	2	2
ACM - GROUP	1	1
ACM - SIGCHI South Africa Chapter 2000	1	1
ACM - SIGITE	1	1
CoDesign: International Journal of CoCreation in Design and the Arts	1	1
Computer Supported Cooperative Work	1	1
iConference 2012	1	1
Information Systems Journal	1	1
International Journal of Medical Informatics	1	1
International Journal of Sociotechnology and Knowledge Development	1	1
IST-Africa	1	1
Journal of Health Informatics in Developing Countries	1	1
Philosophical Transactions of The Royal Society	1	1
Proceedings of the Hawaii International Conference on System Sciences	1	1
Proceedings of the International conference on Digital Government Research	1	1
Springer - HCI	1	1
The Information Society	1	1
<b>Total</b>	<b>95</b>	<b>100%</b>

The data search exercise produced over 200 articles. The initial paper analysis and selection process involved looking for the term 'participation' or close associate in the title, abstract and/or keyword sections of a potential article. All studies including those that used different and/or multiple associated terms as primary key words were considered. In the case of papers that did not provide keyword sections and/or abstract sections, the researcher engaged in the long process of analysing, contemplating and coding the whole text, to decide whether the candidate article concerned the PD theme. The complete scan of the whole body of text to determine whether the preliminary selected article had to be included or excluded was a measure of triangulation used. The iterative process of searching and selecting articles involved: retrieving papers; requesting of papers not available from normal university subscribed portals; reading and analysing the whole body of text; searching through references of candidate papers; and citing papers. Of the over 200 papers originally retrieved, the researcher found 95 relevant to the review study. The publication locations of the articles were widespread and across various repositories (Table 4.2).

The final studies selected drawn from diverse repositories were spread from 1996 to 2013. Similar to Jasperson et al.'s (2002) MISQ review study, Appendix C provides for the related participation constructs and clarity of dimensions related to PD theme from all selected papers. Concerning literature analysis and selection, a Microsoft Excel spreadsheet was used to codify – organise and systemise – keywords, search strings and search analysis, and results for all the papers.

#### **4.4 The ethics of the research**

The ethics of research depends on the assumed worldview. livari (1991) posits three ethical positions that signal the scholars' responsibilities and roles in ISD namely: means-end, interpretive and critical. In means-end orientation, scientists aim to provide the means to achieve goals (ends), without interrogating the authenticity of the ends. The *"interpretive stance questions the realism of the idea of human and organisational goal-oriented action"* (livari, 1991, p. 258). The aim of the interpretive paradigm is to *"enrich people's understanding of their action"* and *"how social order is produced and reproduced"* (Chua, 1986 p. 615). In interpretive research, meanings are constructed through retrospective analysis of actions. Critical research has a 'critical imperative', i.e. the identification, reporting



and possibly redressing of the domination and ideological practice (Chua, 1986). As a result, critical research aims to subject both the means and ends (goals) under critical analysis.

The present study assumed a critical stance, which dictates that the research methodology and conduct have to sensitise the critical aspects of emancipation in subduing exploitation, domination or oppression. To achieve this objective, this literature review study used DS to structure and analyse the ethics of community PD in African contexts. At the outset, the fundamental principles underlying PD phenomena have a 'moral' basis. About ethics of reviewing PD, the study upheld ethical responsibilities of:

- recognising that those in context know most of their problem domain and ways to get activities/work done;
- appreciating the importance of mutual learning and shared understanding between practitioners and other stakeholders;
- identifying, critiquing and reporting the research and practice of involving multiple voices and 'democratising' expressions and actions of all parties;
- investigating the studies that dealt representation of people's ideas and desires;
- recognising that designs (solution spaces or conjectures) are completed in use (context).

The study also considered ethics relating to the DS lens having a critical orientation (Iivari & Venable, 2009). The study interrogated related literature using DS with the aim of promoting and empowering all stakeholders to take part in designing and developing new artefacts that challenge existing power structures of domination in ISD practice and research (Cecez-Kecmanovic, 2001; Iivari & Venable, 2009). The ethical considerations provided a design attitude that questioned and supported the physical and non-physical configurations of PD practice and research in ISD in Africa.

Another area of ethics the study considered was the consequences of conducting a study on the issue of values. Following on ethics of critical research, this review was premised on the belief that work in related studies is value-laden. The study asked whose values and what values dominated the research and practice of *community* PD in ISD in Africa. Although the interest of the study dwelt in the values of a special group of stakeholders (*community-oriented*) the researcher also examined and reflected on how research and practice openly or latently serve the interests of dominant groups. Through the DS lens, the researcher



considered the ethical yet contentious aspects of *who* (should) participate; and *why, when, where and how* community organisations (should) participate in IS design and development. With regard to values of community organisation, the grand objective of incorporating DS in the present critical research was emancipation. This exploratory review of assumptions and claims in literature contributed knowledge to the build-up of frames and methods that could be evaluated and completed in use. To stakeholders, sound and rectified knowledge has the simple ethical effect of informing (detecting) what is good or bad in practice. The value of DS views of formulation, iteration and adaption to stakeholders in PD is the power to deliberate and learn (redress) on the success (failure) of system design, build-up and in context.

#### **4.5 Modes of analysis**

The present review study employs qualitative analysis of text and communication. The use of a systematic method to locate and retrieve literature is the first step towards striving to attain consistency and replicability in results and interpretation. As discussed earlier, a systematic way of data collection aims to explicitly clarify how literature is identified, retrieved and selected. Holding all constant, the procedure has to be reproducible. The preceding discussion also provides procedures and techniques used to analyse texts and to decide which studies will be included or excluded.

Analysing text to decide whether to include or exclude a study is not always straightforward. Positivists generally believe that reality is there just waiting to be observed or measured, and that this 'objective reality' and 'variables' in a study are identifiable and links are easily measurable. On the other hand, critical and interpretive practitioners appreciate the possibility of subjectivity in conducting the literature selection and examinations. A review under critical philosophy, even with a well-defined set of concepts and theories, requires in-depth interpretation and analysis of literature to structure and to inform the investigation.

This study also employs an element of intuition in interpretations and analysis of literature and results. Drawing from Klein and Myers' (1999) principle of suspicion, the study probes deeper than what appears on the surface. In identifying, retrieving and analysing literature, the researcher employs intuition to look into high- and low-ranked journals, websites and conference proceedings outlets that promise to be hosts of appropriate literature. In

analysing text for selection, the researcher probes beneath the title, abstract and keywords for the studies that seem to be potential candidates but do not meet the selection criteria outright. Preliminary search and analysis reveal that individuals and organisations discuss, exercise and assess the topic of 'participatory design' under many different forms, shapes and styles.

As discussed earlier, this study employs DS to examine the pragmatic issues surrounding the formulation, devising and evaluating artefacts in context. In metaphoric terms, the researcher removes the 'positivist straight jacket' and wears the alternative 'critical jacket' in order to encounter the complex social reality of Africa in a different gear (Levy & Hirschheim, 2012). Scientists hardly invent or break new grounds by hardened conventionality. Rather, if IS scholars are to transform societies by PD, then they ought to move towards knowledge coherence and develop further the ideas from 'orthodox' thinking.

Viewing the material and immaterial elements of DS through the lens of critical philosophy is a promising way to analyse and comprehend the complex relationship, if any, of participation development in Africa, with or without Information Systems. Considering a PD ensures that the study makes a complete analysis of both the positives and negatives of ISs. Evidently, top journals have also started looking into the dark side of IT use (Tarafdar, Gupta & Turel, 2013). It is apparent that taking a particular kind of frame to arrange thoughts and an analysis has consequences, not only to the integrity and acceptance of knowledge claims made, but on the social life and performance of the organisation. The modes of framing and analysis chosen dictate not only the quality of scientific work produced but they determine how far scholars may transform lives.

#### **4.6 Limitations and delimitations of the study**

The limitations and resolutions of the present study are as follows. The credibility of the present review study depends largely on the research conduct and reasoning in synthesising and analysing results.

The first limitation is that the analysis was carried out on the literature from publication locations that subscribe to diverse methodological and structural characteristics. The restrictions arise in synthesising and analysing articles of divergent qualities and structures.

Although debatable, the rigour and format of a conference paper is usually different from that of a journal paper. As such, the papers provided limited details on methods in use; stating clearly whether empirical or non-empirical study; and what practitioners actually do in researching or practising PD. The researcher tackled this limitation by carrying out an extensive exercise of selecting papers, and by interpreting and interpolating of data, as well as of the whole body of text. The article selection was based on a theoretical sampling and the researcher carefully read through the abstracts, keywords and titles. In a number of papers that had no abstracts, no keywords and had an unclear title, the researcher read the whole body of text to determine whether to include/exclude the article. Admittedly, there is an element of arbitration involved in the selection. The study does not guarantee that the claims made are solely 'right or true', given that interpretations are subjective. The aim was to provide the cogent, well-argued and most believable among the possible multiple interpretations (Iivari, Hirschheim & Klein, 1998). To avoid misunderstandings in selection and interpretations, Appendix C provides brief definitions of dimensions in article related to PD topic.

Secondly, even though the study intended to generalise detailed facts through inductive reasoning, the thinking process was prone to be reductive. Reductive reasoning means a trial to understand the nature of a complex topic by reducing it to observable facts or interaction of its parts (i.e. deduction). However, inductive thinking progresses from instances, events or individual cases towards developing principles of generality. The limitation of reductive reasoning is that it is inward-facing. In other words, the reductionists attempt to reason and explain complex scenarios through pure facts – from cause to effect. This restricts understanding of higher levels of organisational complexity involving culture and larger number of interactive systems. Inductive reasoning – an outward facing strategy – attempts to look for 'opportunities' by making inferences into the future. To resolve the limitation, the researcher employs moral reasoning – appreciating the difficulty of making moral decisions – and understands that people do not operate in a vacuum. Moral reasoning is a mental process that is set in motion to determine what is right or wrong in a moral dilemma. Values are motivational preferences and dispositions. Moral values are those preferences that are integral to any moral reasoning process. Thus, the analysis focused on the norms and

standards of acts reflected in texts and communications that 'are' or 'ought to become' the values of a given community organisation.

#### **4.7 Research validity and reliability**

The research validity and reliability of the study include the following: The review studies were derived from sources recommended by the Association of Information Systems (AIS) and were all peer refereed. A combination of keywords was used to find relevant papers (Table 4.4). Snowball sampling method was used to check and identify other related studies. The triangulation of the data included checking and analysing keywords from the title, abstract and keywords section of the potential studies. The text from title, abstract and body of text had to concern participation or associated variation. The complete body of text was also used to verify earlier observations and analysis of the title, abstract and keywords.

#### **4.8 Summary of research methodology**

The study was carried out in the belief that thoughts and praxes of community PD can be interrogated within the critical research philosophy. The critical research paradigm concerns principles of getting insight and critiquing, as well as the element of transformation. Transformation means improvements to the existence of beings, social arrangements and social theories. In this study, the methodological process of getting insight, constructively critiquing in the hope of enabling transformation began with an 'exhaustive' search for literature and well-grounded selection criteria. The researcher believes the search and selection process in use in this study was thorough in attaining a representative sample of relevant review papers. The research methodology used – searching, selecting and analysing data – follows on IS review guidelines and past studies of highly rated IS authors. The researcher searched data from top IS journal areas from conferences down to lowly rated data repositories that may possibly have hosted studies on the topic in question. The study raised the quality and credibility of the data through a thorough selection process. A sample of 95 studies is representative enough to analyse and gain insight on the community PD phenomenon in African contexts. The following chapter presents and synthesises the research findings.

## 5. Synthesis of research findings

The previous chapter discussed the methodology followed to identify and select data. This chapter presents findings on the community PD practice in Africa. The results are about trends of community participation practice in IS design and development in African contexts. The study uses DS principles to characterise the conceptualisation of PD phenomena in Africa. In reaching the arguments, as described by Thompson and Walsham (2010, p. 114), the researcher makes *“no claims for completeness of [the] broadened focus, and accepts that others may wish to add further ways”* in which the review studies depict participation of community organisations. Nonetheless, the study undertakes, drawing on preceding worldviews on PD in ISD, the challenge to reflect on community organisational realities and visions, while remaining constantly critical. The key stakeholder of attention is the community organisation participating in ISD activities.

The different conceptualisations of community PD in Africa are presented first followed by findings on ethics and standards of conducting, checking and balancing the dynamics of PD. The results under the ethics of PD show the fundamental moral principles instituting community PD in Africa. The standards of PD mean the basis or point of reference for the process of conducting community PD. The checks and balances are themes in PD of verifying or enforcing claims against the proposed measures (ethics and standards) of PD. The excerpts in Appendices C and D describe text from a PD viewpoint and provide the basis of data analysis and discussions of the findings. In particular, Appendices C and D provide a comprehensive synthesis of PD related dimensions of each and every review paper. The aim of the appendices is not to reproduce all text in review studies but rather to link discussions in articles to the topic in question.

### 5.1 Conceptualisations of community participatory design

The review studies show that the community PD phenomenon is conceived, represented and/or gestated in many different ways. Table 5.1 reveals the general types of conceptualising community participation in IS design in Africa.

Table 5.1: Generalised conceptualisations of participatory design of review studies

Related aspects of conceptualising PD	
Citizen involvement, community involvement; civil society participation, public participation and mass participation; Co-creation, co-design; Collaboration, cooperation; Community engagement, civic engagement; Community participation, participatory community; Community PD, community centred design; Control and ownership; Crowdsourcing; Decentralisation and decision making; Design; Dialogue, discussion, negotiation, consultation; Emancipation, empowered design; Engagement; Free, freedom, liberty, liberalisation, collective.	Governance; Inclusion/exclusion; Information creation, processing; Dissemination and reception; Interaction, deliberate interactions; Knowledge management – discovering; Knowledge, knowledge sharing and preserving; Open and openness; Participation; Participatory communication; PD; Representation; Social responsibility; Stakeholder collaboration; User centred design; User participation.

The articles reveal that, under the topic of community participation, practitioners associate the concepts of *the public*, *collective/group of beneficiaries* and *users* with the community. Table 5.2 shows the proportions of papers that talk about respective stakeholders. For a chosen social group in Table 5.2, at least 60% of the papers make reference to a given group of social actors.

Table 5.2: Percent of papers citing a given social group

Social actors	Percent of article discussing actor ... (Social actors overlap across articles)
Community	82%
User	77%
Public	74%
Collective/Group	60%

In addition to what the review studies say are the popular forms of referencing social groups, certain scholars also use numerous other names, shown in Table 5.3. Nonetheless, without going deep into the linguistic clarities, scholars loosely use the names to identify the people of the same calibre and/or social circumstances in a given developing setting, i.e. a community social group in an African context.

Table 5.3: Articles referencing different social groups

Social group	Referencing articles
Citizens	Byrne & Gregory, (2006), Misuraca (2006),
Stakeholders	Korpela et al. (1998); Denison & Stillman, (2012); Mthoko & Pade-Khene, (2012)
Lay people	Ojo, (2006),
Locals	Braa & Hedberg, (2002); Blake & Tucker, (2006); Blake & Garzon, (2012),
Internal people	Jokonya & Hardman, (2011); de Jager, Buitendag & van der Walt (2012)
Indigenous people	Thinyane et al. (2007); Bidwell & Hardy, (2009); Lwoga, Ngulube & Stilwell (2010); Winschiers-Theophilus et al. (2010); Zorn, Winschiers & Theophilus (2010); Bidwell, Winschiers-Theophilus, Koch-Kapure, & Chivuno-Kuria, (2011); Denison & Stillman, (2012); Rodil, Winschiers-Theophilus & Jensen (2012); Winschiers-Theophilus, Bidwell & Blake, (2012)
Natives	Wyche, Smyth, Chetty, Aoki & Grinter (2010)
Marginalised	Byrne & Sahay, (2007); Thinyane et al. (2007); Andrade & Urquhart, (2012)

Still on conceptualisations, the researcher found that the review articles discuss PD issues following on the design elements modelled by McKay et al. (2012), i.e. design as relating to a (n): problem-solving, product, process and action, intention, planning, communication, experience, value, professional practice, and community organisational practice and/or service. The researcher used the design elements of McKay et al. (2012) to group similar review studies that exercise and report on community PD as a specific kind of design conception. Table 5.4 classify the different DS issues in PD and Appendix D shows the comprehensive distribution of conceptualisations of the respective review articles.



Table 5.4: Summary of design-related conceptualisations of participatory design

Conceptualising community PD as a ...	No. of articles	Percent of articles
Process, action	55	57%
Professional and community organisation practice	50	52%
Product	29	30%
Problem-solving	15	16%
Planning	12	13%
Value	11	11%
Intention	10	10%
Experience	10	10%
Service	10	10%
Communication	8	8%
<b>Total (NB: Conceptualisations overlap across the articles)</b>	<b>95</b>	<b>100%</b>

## 5.2 The ethics of community participatory design

The review papers show that the ethics relating to openness and freedom to act; inclusion and representation in shared development; and amenable (flexible) infrastructures for development, are central to community PD. The review articles explicitly delineate ethics as a set of lifelong values and morals required in conducting PD. Literature provides evidence that ethics concern not only the prerequisites of conducting PD, but include continued abiding with moral values and philosophy. In our analysis on exercising ethics of care, any proposal to change the traditional African community organisation has to be diligent, hence the need for amenable (flexible) infrastructures for development. Therefore, the researcher associates ethics values with organisational flexibility and agility to structure and devise innovative development paths to consciously enhance knowledge, capacity and morale to participate.

### 5.2.1 Free and open to act upon

The main topic of discussion with regard to ethics considerations in community PD is the morality and cost of openness and freedom to act upon and be acted upon. Most of the discussions on the freedom and openness domain centre on question of rightness or wrongness of acting upon and being acted upon. The right/wrong dilemma in free and open motives includes the cost and benefit of free and open development. The papers show that



one of the critical ethical concerns in community PD practice is the establishment and upholding of openness and freedom to act or be acted upon. Davis and Jabeen (2011) and Chawner (2012) discuss openness and freedom aspects from the traditional viewpoint of the Free/Libre and Open research stream. Following on the open and free ideology, seven different review articles discuss the PD phenomenon from a perspective of Open Development (Smith, Elder & Emdon, 2011).

In principle, the review studies say it is ethical and moral to be open and to enable freedom to participate. The presumption is that open and free systems usher opportunities to all who want to grab the chance to: (1) influence the system structures and courses of action; and (2) access, use, own, control, and/or re-distribute systems made (Ahmed, 2007; Ballantyne, 2009). Openness and freedom are seen as ingredients of egalitarian participation (Thinyane et al. 2007; Winschiers-Theophilus et al. 2012) and emancipatory involvement (Krauss, 2012). Papers argue that it is ethically right (ethics of right) to openly engage all parties in co-creation artefacts, sharing of knowledge and making systems accessible to be acted upon.

Exercising ethics, say Mthoko and Pade-Khene (2012), goes beyond intentions to actual responsibilities in conducting community PD research and practice. The social responsibility in PD starts with *intentions* to *plan*, structure and enact dimensions of openness and freedom. Mthoko and Pade-Khene (2012) and Denison and Stillman (2012) indicate such intentional plans of socially responsible participation in the form of an ethical framework of participation practice. Loudon and Rivett (2011) put forward that, after putting in place the plans, the ethical frames of openness and freedom have to actually be enacted and experienced in PD problem-solving, processes and actions, service, communication, practice and product.

As Denison and Stillman (2012) indicate, there are ethical challenges in PD models with regard to ownership, accountability and accessibility. The open and freedom to act (acted upon) has also a dark side. Because of the known potential dark side, Harvey (2011) indicates that parties have to negotiate and monitor freedoms to take part in open and free systems. The monitoring or 'guardianship' of freedoms brings up another ethical issue of whether community 'gatekeepers' safeguard organisational interests or serve other interests through closure and privileging the elite group.

### 5.2.2 Inclusive, representative and shared development

Data show that the ethical issues of who, why, when, how and what is to be included, excluded, represented and/or shared preoccupy actors in PD practice. Thinyane et al. (2007) provide for inclusion as taking into account the views, sentiments and influences of all parties, especially marginalised groups, in decision-making and knowledge management. Drawing from Morrison et al. (2012) mass participation analogue, the ideal situation of inclusiveness includes instilling a sense of participation by *all* entities. The review studies further show that the morality of representation includes the representation of both humans and the social things and happenings (Chilundo & Sahay, 2005).

The ethical question within systems development in developing contexts in Africa is: *How do IS scholars include and/or represent both the people and the features and events of the world in which they live?* A few papers in the present data set have tried to answer this question of inclusion and representation. Aanestad, Monteiro and Nielsen (2007) argue that representation, by its very nature, is political. Further, they contend that the reality that IS scholars intend to represent is 'messy' and that they ought to accept this inescapable messiness in their quest to seek IS solutions. Sadly, misrepresentations exacerbate social inequalities and hinder opportunities for all. Chilundo and Sahay (2005) assert that it is a challenge to construct representations and achieve a network of heterogeneity – of people, organisations, practices and artefacts – to influence the design and use of IS.

Zorn et al. (2010) report and depict a colourful baobab tree as a shared canvas (Figure 5.1). The figure shows the baobab prototype crafted through the inclusion and contributions of different people in a joint effort of crafting. The masterpiece tree engraving depicts the practice of including different community parties in participatory practice and working together to represent something the parties share in common (Zorn et al. 2010). Such representations of practices and people in African settings may seem odd and maverick, yet remains innovative and promising.



Figure 5.1: Baobab Prototype of shared designing by Zorn et al. (2010, p. 273)

### 5.2.3 Amenable infrastructures for development

The premise of PD is that it is just and fair to provide amenable infrastructures that can afford openness and freedom to participate, to all stakeholders involved. From the outset it is ethical that structures of openness and freedom to participate are developed and people are aware of them. On the Global Text Project, Watson and McCubbrey (2009) argue for setting up a structure for collaborative creation of content that is open and free to students in need. The authors report on structuring a platform for open electronic content, engaging the global community to contribute texts and involving the intended beneficiaries in open and free content library initiative. They suggest structures such as commissioning books through voluntary writing of text; acquiring out-of-print texts; and possibly buying copyright so as to publish and release the books under Creative Commons Licence to the developing world.

On the same issue of building and using flexible platforms to access, share and convey knowledge, Ballantyne (2009) puts forward that developing community organisations are moving from being passive recipients to becoming active producers. Developing community organisations are innovating and making use of new tools, structures and platforms to openly and interactively co-produce knowledge (Ballantyne, 2009). This kind of involvement and engagement is feasible if there is, according to Muniafu, Van de Kar and Van Rensburg (2005), an environment to support such participation in decision-making in IS projects. Drawing from Aanestad et al. (2007), there has to be in-built amenable infrastructures and systems to allow people to set up policies and plans, make decisions and consume open and shared goods such as public goods and services.

### 5.3 Standards of participatory design conduct

The standards of PD build on the ethical principles of PD research and practice. Work labelled under PD has to set standards of dialogue, interactivity, co-creation as well as general involvement and engagement of all parties (referred to as participation). The principles of ethics underlying the setting and exercising of the standards are openness and freedom to act (be acted upon); inclusion, representation and sharing; and flexibility in infrastructures for development. The standards are the point of references or desirable guidance for the PD problem-solving, processes and actions, service, professional and community organisational practice and communication.

#### 5.3.1 Dialogic, information sharing and negotiability

The gist of PD in community organisations is to incorporate ideas and knowledge from the members (Kimaro & Sahay, 2007; Lwoga et al., 2010; Pfeffer Baud, Denis, Scott & Sydenstricker-Neto, 2013) and mutually learn and interpret situations with the member stakeholders (Elovaara, Igira & Mörtberg, 2006). The standard of dialogue and negotiation creates partnerships (Korpela et al., 1998) to formulate knowledge through reflection and engaging of all parties in a discourse (Kendall, Kendall & Kah, 2006; Ferguson, Soekijad, Huysman & Vaast, 2013) and continuous negotiations of perspectives, structures and systems (Lewis, 2005; Mosemghvdlishvili & Jansz, 2012; Rodil et al., 2012; Harvey, 2011). The goal of information sharing, critiquing and negotiation among stakeholders and hearing of diverse views (Brandt & Messeter, 2004) is to design and develop relevant systems with appropriate functionalities. The term 'systems' not only means IS software, hardware or networks, but also implies the space surrounding the PD efforts, such as: mechanisms of inclusion and representation (Awotwi, Ojo & Janowski, 2011), structures for openness (Harvey, 2011), and communication and negotiation platforms.

Literature shows that the impetus behind PD is to share information and dialogue, and/or negotiate positions. Lewis (2005), Harvey (2011) and Mosemghvdlishvili and Jansz (2012) contend that the designs and structures of policies, road-maps, infrastructure, framework and approach are not simply given but they are negotiated. The ethics of PD practice is not autonomous but it is deliberated, moulded and negotiated between parties to devise a

system shared by organisational members. Absence of a platform for information-sharing and negotiations means that there is a restricted or secluded interaction between parties. To recap, the standard of talking, reflecting on other people's thinking and negotiating positions, is primal in conducting PD.

### **5.3.2 Interactive eco-system**

An interactive eco-system is the standard of PD closely related to dialogue. Exercising community PD implies that there is interaction and interactivity between actors, the environment and some designed artefacts (Marsden, Maunder & Parker, 2008; Anokwa et al., 2009; Bidwell et al., 2011). The standard of interactivity includes both the HCI (Dearden, 2008; Anokwa et al., 2009) and the interactions between human beings and nature (Bidwell & Browning, 2010; Bidwell et al., 2011). An ecosystem of interactivity has to be conducive for humans to interact between each other through dialogue and actions (Ojo, 2006; Anokwa et al., 2009) and with artefacts and nature through actions, observations and contact (Bidwell & Browning, 2010; Bidwell et al., 2011).

The premise on interactions and interactivity in PD is the shift from solitary conception and development towards interactive innovations among actors, non-actors and nature. The term 'nature' loosely implies the environment, context or the universe of human beings, and living and non-living things. Interactions and interactivity steer communication networking (Ojo, 2006), learning by sharing experiences (Anokwa et al., 2009), interplays among people and reciprocal 'actions and reactions' between humans and nature in designing systems (Marsden et al., 2008; Bidwell & Browning, 2010; Bidwell et al., 2011).

### **5.3.3 Co-creativity and collaboration**

The rationale behind dialogue and interaction is to collaboratively realise and create artefacts. The standard of co-creativity and collaboration lends to cooperative discovering, learning and sharing of knowledge within a group, i.e. collaborative means of sharing, critiquing and producing products. Uwadia et al. (2006) characterise collaboration as the involvement and participation of various groups of people from concerned institutions to work together in producing a system that benefits everyone. Using the LL platform, de Jager et al. (2012) look at another level of collaboration in knowledge management – collaborative innovation and

knowledge discovery. Basically collaborative innovation and knowledge discovery is the *"connection of people with people and people with information"* so that they may generate and disseminate knowledge while remaining *"open to new ideas and critics; sceptical; use and create own information; voice own arguments and be able to listen to people and tolerate other people's thinking"* (de Jager et al., 2012, p. 4).

The campaigns toward 'free and open' internet access and pervasive technologies have made it easy to co-produce almost anything, especially for the entities without ample resources, capacities and related knowledge. Ease of access enhanced attaining of free, less costly and open participation. Hellstrom and Karefelt (2012) explore co-creativity in using the 'easily-accessible' mobile phones in crowdsourcing. Pade-Khene, Palmer and Kavhai (2010) put forward the public-private-civic partnerships as the underlying co-creation philosophy in the (Living Lab) LL research and practice.

#### **5.3.4 Involvement and incorporation**

The standard of involvement and incorporation in PD requires going beyond the superficial notions of physical attendance and talking without doing. The higher level of involvement and incorporation requires designers to be aware of and to recognise the defining features and attributes in system design (Blake, Steventon, Edge & Foster, 2001). The awareness and recognition may be towards other people or towards natural places and the environment (Bidwell et al., 2011). While people get involved in ISD through actions and dialogue, the natural, wild or degradable state of the environment also 'communicates' messages that can be incorporated in designs (Aynekulu, Wubneh, Birhane & Begashawl, 2006; Bidwell & Hardy, 2009; Bidwell & Browning, 2010; Bidwell et al., 2011). Through observation, listening and contact, practitioners and inhabitants are involved in and participate with nature and the environment in systems design and development. Bidwell et al. (2011) provide an intriguing discussion of the embodiments and narratives of the herbal lore to depict incorporation of the indigenous knowledge in system designs. The authors use the awareness and recognition of the herbal lore of the indigenous people to make meanings and elicit design ideas. The involvement standard looks at the people's requirements, fears and the environment, as well as incorporating the subsequent ideas into the design.

## 5.4 Checks and balances of participatory design

This study refers to the principles that guide claims, behaviours and actions of practitioners as checks and balances of community PD. Participatory design requires checking and balancing reality with purported design work, since it is multivariate, costly, political and complex (Kensing & Blomberg, 1998; Sabiescu, 2014). As a consequence, PD is a pragmatic reflective activity that fosters mutual learning through monitoring and evaluation. The checks and balances of PD apply to general operations and to all stakeholders: general population, 'gatekeepers', designers, managers, sponsors or authority (i.e. reflexivity) (Krauss, 2012).

### 5.4.1 Democratic governance and justice in empowerment

Participatory design in ISD not only has socio-economic and technical dimensions, but it also has power relations and institutional connotations. Where there are diverse groups of people interacting, governance aspects are bound to occur. Some complex questions in the discourse on community PD in Africa include: Who is (supposed to be) in charge and who is supposed to own and control the project? How do the governed people inform and influence decisions on the system and design? What are the boundaries of the administrators participating in the ISD process, i.e. practitioners, researchers, sponsors and externals? How is input from participants incorporated in system design and development? Therefore, it is essential to check and balance the space around institutional design of an organisation involved in PD to verify or enforce justice, legitimacy and effective management.

Governance virtually concerns power or authority. The advent of ICTs towards the e-era (electronic-era) has led to inclusion of the once-excluded individuals. Bellithathan, Weldeemaet and Asfaw (2008), on governance in e-environment, argue that, because of the pervasive ICTs, the once-powerless rural communities can now be included in decision-making on environmental issues. The e-governance in Africa, Misuraca (2006) says, has increased capacity of the governed to check transparency, ensure accountability and take part in decision-making, thus instituting the decentralisation of power in system design, development and use. Ochara (2008) contends that such an enabling environment is emerging for social inclusion and involving all people through e-governance infrastructures and platforms. Yet ultimately the aim of community PD is to institute, ensure and develop a

platform of good governance through IS (Waema & Mitullah, 2007). Good governance, according to Waema and Mitullah (2007), promotes participation, transparency, efficiency and effectiveness, responsiveness, equity, accountability, rule of law, consensus orientation and strategic vision. The drive towards ethical conduct and just empowerment requires surveillance and monitoring of a range of governance issues such as: responsibilities and accountability of the *practitioner/researcher*, dimensions of democracy across the entire ISD system and preservation of the *environment*.

Data show that the 'dominant' stakeholders are at the centre of democratic governance and justice in empowering organisations to participate in systems design and development. Krauss (2012) provocatively puts forward that the 'dominant' person engaging the community emancipation has to do a 'reality check' more on oneself than on the community to be emancipated, in the following ways:

- i. The 'dominant person' has to self-reflect and self-critique on the thinking informing his/her decisions and actions on the whole process of ISD (Krauss, 2012).
- ii. The 'dominant' person has to meticulously identify and explore the ethical challenges behind the frames informing the community PD practice within a given context (Denison & Stillman, 2012).
- iii. The system to be designed and developed has to be context-sensitive (Blake & Tucker, 2006; Marsden, 2008). The design has to be shared among 'dominant persons' and the 'weak people' (Zorn et al., 2010) to result in an empowered system design for all (Marsden, 2008).
- iv. All these ethical considerations are meant to empower the community (Braa, 1996) to become involved and to instil a sense of liberty to participate in developing solutions to their challenges (Andrade & Urquhart, 2012). Because of institutional factors that constrain this liberty, the community environment has to be checked and adapted to empower the local people to contribute to the ISD (Braa, 1996; Andrade & Urquhart, 2012).

#### **5.4.2 Continued design, development and evaluation towards sustainability**

A number of the corpus fall under the theme of continued design and development for sustenance and independence. While all review studies discuss design aspects in one way or



another, 18 studies primarily delineate immediate issues of design and development. Data show that to *design* (the act of enacting i.e. the verb design), a *design* (product of the act i.e. the noun design) is to restructure, reconstruct, explore, examine, interact and collaborate, hypothesise, prototype, explore, propose, introduce and research, theorise and develop. The broad motive evident across literature is to *design* and *develop* for success, sustainability and human growth and development of the organisational members (Chetty, Tucker, & Blake, 2004).

To attain such a highly esteemed objective, the act of *designing* and the eventual *design* product has to be 'conscious' of and fit the context (Chetty et al. 2004; Camara, Nocera & Dunckley, 2008). In other words the designing and development of a design has to be relevant (Chetty et al., 2004), applicable (de Vreede, Mgaya & Qureshi, 2003), facilitate social communication and interaction (Foth, Gonzalez & Taylor, 2006) and be usable (Winschiers, 2006; Winschiers-Theophilus, 2009) in developing settings. The first thing to do in designing, developing and implementing systems in unstable environments (Van de Kar, Muniafu & Wang, 2006) is to grasp the underlying 'participatory' design assumptions and expectations (Winschiers-Theophilus et al., 2012). One need an ontology model to design and introduce IS solutions in a given context (Ramachandran, Kam, Chiu, Canny & Frankel, 2007; Thinyane et al., 2007). Where there is none available, one has to propose and formulate the IS design premises and operational frameworks to guide one's work (Muhren, Eede & Van de Walle, 2008; Mthoko & Pade-Khene, 2012).

Mursu et al. (2000) and Winschiers-Theophilus et al. (2010) explain that checking what happens in reality against expected plans and desires makes PD in Africa unique and extraordinary. The uniqueness comes from the contexts that shape and inform the design assumptions, claims, frames and models. Accordingly, practitioners working in developing contexts have to check and balance alternative design visions (Wyche et al., 2010) through representations, engagements, discussions, collaboration, interactions and participatory research and development (Byrne & Gregory, 2006; Mainsah & Morrison, 2012; Merritt & Stolterman, 2012). Examples of designs emanating from alternative envisioning in Africa include:

- The exploration of African village metaphor in designing user interface icons by Heukelman and Obono (2008);

- The designing of Water alert system by Brown, Marsden and Rivett (2012);
- The designing of Animal tracking system by Blake et al. (2001);
- The designing of Digital platform to support service delivery by Dlodlo, Ford and Marques (2008);
- The designing of HIS in diverse contexts of South Africa (e.g. Braa, 1996); Mozambique (e.g. Chilundo & Sahay, 2005); Tanzania (Kimaro & Sahay, 2007; Kimaro & Titlestad, 2008); Ghana (Luk, Ho & Aoki, 2008) and Nigeria (Korpela et al., 1998).

A word of caution in most review studies is that neither technology nor mere PD of the community is a panacea for all social ills in Africa. Therefore it is prudent for communities to continuously evaluate and review both their own participation and the systems in place in the ISD change process. As argued earlier, ideally all parties or at least their 'true' representatives have to take part in ISD activities, including the evaluation and monitoring process. The mass participation study of Morrison et al. (2012) of over 10 000 users is a perfect trial of including a diverse and large group of people. Morrison et al. (2012) say this kind of scale gives more representation to verify, evaluate and tally data from a small sample to a larger (or nearly the whole population).

The focus in evaluative participation is to carry out checks and balances on the representativeness and performance of IS designs. Aynekulu et al. (2006), for instance, discuss how evaluative participation of the local people inform and contribute to sharing and building up knowledge on land degradation in a Geographical Participatory Information System (GPIS) project. Participants in this scenario assess, evaluate and debate amongst themselves on environmental changes that took place and in the process inform and build a knowledge portfolio on land degradation management through GPIS. Data reveal that evaluative participation of the community is therefore an assessment, a monitoring and controlling instrument of system research, trials, design, development and use (Aynekulu et al., 2006; Morrison et al., 2012).

The process of community PD in ISD is not immune to the question of sustainable development. All aspects of community PD in one form or another eventually lead to notions of sustenance and sustainable development, as argued in the two review studies on designing sustainable systems by Van Rensburg, Veldsman and Jenkins (2008) and Blake and Garzon

(2012). Van Rensburg et al. (2008) cite failure as the most susceptible and negative covariant of sustainability. Failure, on the undesirable end means cessation, projects dilapidating to dust, little or no success, continued ultra-poverty, widening social gaps and digital divides, smart exclusions and reincarnated incapability. The ideal end of sustainability refers to continuity, success, progress, self-sustenance, growth and development, being weaned-off, distributed, decentralised 'local' production, adaptation, control and ownership, and coordinated and collaborative partnership designs. Blake and Garzon (2012) argue that one of the worst realities of developing communities in alleged IS-enabled poverty alleviation is majority non-sustainment camouflaged by information inequalities, limited or lack of freedoms and counterfeit participation of the majority.

### **5.4.3 Research and development of the methodology, standards and policy**

An important aspect in evaluating and monitoring PD conduct is competence, or at least keenness to improve and maintain competence. There has to be research and development of the models, framework, claims and philosophical assumptions underlying community PD. Further, the entirety of affected people, or their representatives, has to contribute ideas to IS design. Three papers of Cogburn (2004), Dralega, Due and Skogerbø (2010) and Thompson and Walsham (2010) are identified as constituting this theme.

A unique yet elusive dimension of checking PD practice is taking part in research, dialogue and deliberations on IS standards and policy. Cogburn (2004) argues that it matters to have diversity, dialogue and participation of multiple stakeholders, inclusive of the structurally-excluded, in discussing standards and policy issues. Cogburn (2004) and Thompson and Walsham (2010), in separate accounts, challenge developing countries to engage in ICT research and development and participate in ICT policy formation to enable a focus on strategic development. However, developing organisations, Thompson and Walsham (2010) contend, barely take part in or engage in this arena. Political instability and undemocratic systems that ignores the multiplicity of stakeholders usually constrain communities that try to establish participation platforms to assess and inform standards and policy issues (Dralega et al., 2010).

As is the pattern with nascent sub-disciplines that are not published in top AIS journals, most of the review articles were primarily published in specialised or 'niche' outlets. As shown in

the analysis, studies on African contexts are methodologically diverse, fragmented and scattered across a number of conferences and peripheral journals, thereby hindering consistent build-up of knowledge. To interrogate PD conduct, there has to be a cumulative build-up of knowledge on the theory, methodologies, standards and policies, to engrain competence and efficacy in PD.

### **5.5 Participatory design approaches, theoretical perspectives and methodologies in Africa**

Review studies show that PD neither comprises of one approach nor a single methodology, but it is a prolific family of tools, techniques and theoretical perspectives that can be co-mingled, adapted and extended into innovative methodologies and approaches. Data show compelling new approaches in use in PD in Africa.

Data reveal that the practice of PD is also inscribed in certain methodologies. This means that PD is the underlying structure and guide of a methodology. The review studies interchangeably used the term *approach* with *methodology*. Hence, certain approaches in Table 5.5 are similar to methodologies in Table 5.6. A methodology is understood not only as methods, tools and techniques, but also as consisting of assumptions, theoretical perspectives and philosophical underpinnings. Since philosophical underpinnings are also referred to as approaches or paradigms, the methodologies in Table 5.6 are guided and structured through approaches in Table 5.5. All in all, the said methodologies and approaches are about PD and development. While some approaches and methodologies are clear cut, others may not at face appear to concern PD.

Table 5.5 Participatory design approaches in African contexts

Action research;	Interactive approach;
Actor network, social networking, community networking	Free & open, open-source, open development;
applied research approach;	Group support systems approach;
Bottom-up approach;	Indigenous knowledge systems, KM approach;
Crowdsourcing;	Interdisciplinary, inter-organisation approach;
Centralised design, decentralised, liberal approach;	Local design approach;
Collaborative and inclusive approach;	LL approach;
Community-based, community-driven, community-centred approach;	Participatory AR, participatory
Context aware computing, contextual, situated approach;	communication, participatory community; PD,
Critical philosophical approach;	Participatory GIS;
Creative commons approach;	Progressive PD;
Cultural design approach;	Pragmatic design approach;
Design reality gap;	Reflective systems development approach;
Dialogic, negotiation and contestation approach;	Socially responsible, socio-technical approach;
Dramatistic approach;	Sen's capability, social capability approach;
Democratic approach;	Service design approach;
Ethnography, ethnomethodology approach;	Ubuntu philosophy approach;
Emancipatory approach;	User centred, user centric approach;
Ethical approach.	Value sensitive design approach.

Table 5.6 Participatory design methodologies in African contexts

Agricultural information and processing for development;	IS/IT design and adoption;
Community networks;	Knowledge sharing and pooling;
Computer-mediated communication;	LL;
Design through game and play;	Location and context aware system;
Digital doorway;	Mobile application software development, mobile ICT for development (MICT4D), mobile-based game;
Digital inclusion;	Open access, OSS, open Government, open ICTs;
e-conference, e-government, e-inclusion, e-monitoring, e-environment, e-commerce, e-resolution, e-participation, e-governance ( <i>e-methodologies</i> );	PD, PD Community research (PCR), Participatory GIS (PGIS);
FLOSS;	Smart tools for evaluation;
Group support systems;	Social media, exchange, and networks;
HISP;	Socially aware software engineering;
HCI for development (HCI4D);	Software engineering learning;
ICT policy, research and practice;	Spatial data infrastructures;
ICT4D research and practice;	Speech and oral communication;
Interaction design, interactive systems;	Strategies and policy formulation;
Internet/web.	Teaching and curriculum formulation through traditional and co-operative learning;
	Telemedicine.

## 5.6 Summary of research findings

Practitioners and researchers conceptualise and operationalise PD vastly. It also follows that writings on PD are novel and the domain covered is wide. In sum, the widely compelling and innovative conceptualisations and approaches of PD in African contexts are means with which practitioners engage in the reciting of stories, making of things and enacting futuristic systems of human transformation, prosperity and continuity. A proliferating family of PD thinking and reasoning comes with a wide-ranging set of discussions and implications. From the diverse aspects found, the results cohere into three categories: The first category of ethical conduct relates to pre-requisites and principles that underlie any PD work. The second category of standards provides point of references to base conduct in PD research and practice. Themes of checks and balances of PD are the third category.

The next chapter discusses the research findings and their implications.

6. Discussion and implications

The previous chapter presented the findings on the analyses of different conceptualisations and syntheses of various presumptions of conducting PD in Africa. This chapter covers the discussion and implications of the findings. The chapter discusses what is known and what needs to be known about PD and suggests how to achieve the desired state of knowledge and practice of PD. The arguments in this discussion are guided by the critical perspectives on DS data analysis and interpretations. Critical views of transformation redefinition deals with issues of power and knowledge redistribution in order for the parties to emancipate themselves (Myers & Klein, 2011). The discussion centres on how PD practice in Africa constructs or restructures power relations by defining and legitimising actions and knowledge. The arguments presented portray how practitioners engage with the discourse on PD in Africa.

6.1 What is known about participatory design

The related literature portrays vast accounts on what is known about PD in Africa. This sub-section is categorised into: participation and development linkage; power and identity; and PD complexity.

6.1.1 Participatory design in development discourse

Loosely, all reviewed studies infer that there is a relationship between PD and development. The principle is that participation of an organisation in the IS design processes and activities either directly or indirectly lead to development. The term development is understood to mean *inter alia* growth, empowerment, prosperity and sustainability through design, formation and use of IS facilities (Sein & Harindranath, 2004). Data portray that PD enhances the knowledge and capacities of an organisation while a knowledgeable society leads to development (Figure 6.1a). Although PD transitively leads to development; the PD and human development link is neither simple nor one-dimensional.

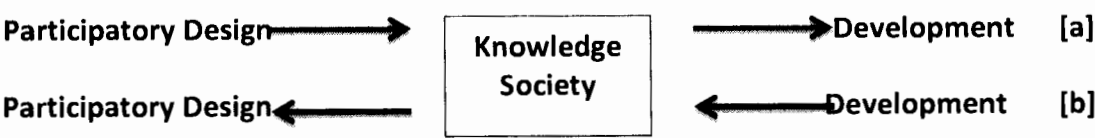


Figure 6.1: Participation-development transitive relationship

What is known from literature is that PD has links with the design and development of both the organisation and IS artefacts. Community PD gives stakeholders the sense that they can ethically tackle their problems through collaborative sense-making, reflection and enacting towards development (Muhren et al., 2008; Jokonya & Hardman, 2011). While the review articles generally suggest that PD leads to community development outcomes, the link may at times be hypothetical and fallible. Data suggest that PD is prevalent in learned and resourceful community organisations. In other words, the levels of education and development also determine the participation extent of organisation in ISD (Figure 6.1b).

### **6.1.2 Identity politics and power dynamics**

Most review studies agree that power relations and identity dynamics shape PD practice. Power dynamics exist in PD activities of: decentralising, collaborating, including/excluding, representing. Blake and Garzon (2012) assert that there has been increased acknowledgement within practice that participation and development are not *power-free concepts*. Rather, the practice and research of PD is seen as an act to balance power relations (Merritt & Stolterman, 2012) and to fight the politics of representation (Aanestad et al., 2007). Both practitioners and the community view power structures and relations in PD phenomena with a zero-sum mentality. A power gain of one stakeholder is a power loss of another party. As a result, parties take cognisance of PD in terms of power and/or identity gain (loss).

The typical elements of PD are a function of power and identity politics. Identity refers to the visions, values, history, culture, stigma and the conscious and unconscious self that define an entity. For instance, we know, following the writings of Winschiers-Theophilus and associated colleagues, that the *ubuntu philosophy* is unique to the African cultural identity (Winschiers-Theophilus et al., 2010; 2012). In developing organisations, especially in rural communities, the *ubuntu philosophy* dictates and in certain cases supplants other counterpart modes of communication, confrontations, mutual understandings and other various ways of living with others. For that reason, the study acknowledges that the elders, people of authority (including practitioners, sponsors and researchers), and elites are by default more privileged to information, decision making, influence, control and ownership.



It is known from literature that PD is an act of redistribution of power, derivable in terms of potential benefits and costs. Participatory design empowers (disempowers) parties to care, manipulate, own, consult, inform, partner, placate, control and delegate authority in the ISD process. Participation in the ISD process affords designs and guides that make differential benefits and costs salient to a located social group. What becomes critical in interpreting and motivating PD practice is the power to process experience and shape actions, as well as the role that identity plays in enabling (constraining) choices.

### **6.1.3 The complexity of participatory design**

The review studies attest that research and practice of community PD in developing countries is complex. The complexity of community PD cuts across many facets and assumes many forms. The first part of the complexity concerns the challenge of grasping and reasoning the PD ideology. The second part of the complexity consists of the *messy reality* characterising African contexts, in which participants live and artefacts are embedded. Data overwhelmingly suggest that the messy reality is the same reason why stakeholders have to engage with each other to better understand and resolve complex problem domains (Bailur, 2007).

#### **6.1.3.1 Optimising participatory design**

With regard to seeking a better understanding of PD, data reveal that there are many aspects involved in PD. The study identifies the PD constructs from a generic view (Table 5.1) and a design view (Table 5.4) as relating to PD phenomena, although they are distinct on their own. The study deducts from literature the factors of an ethical, standardising and evaluative nature that may afford or inhibit success in PD towards development. The terms are used interchangeably in literature with minimal to no differentiation of meaning (see Appendix C for definitions of related terms). It is at times hard to understand and differentiate the various associated terms in PD. The collection of related constructs consists of pervading yet compact concepts when put together, which form the totality of PD phenomena. Still, such diversity of terms may bring obscurity in use but also richness of the topic area. The study defines the collection of related terms of PD as a *cloud of participatory design constructs* (Figure 6.2).

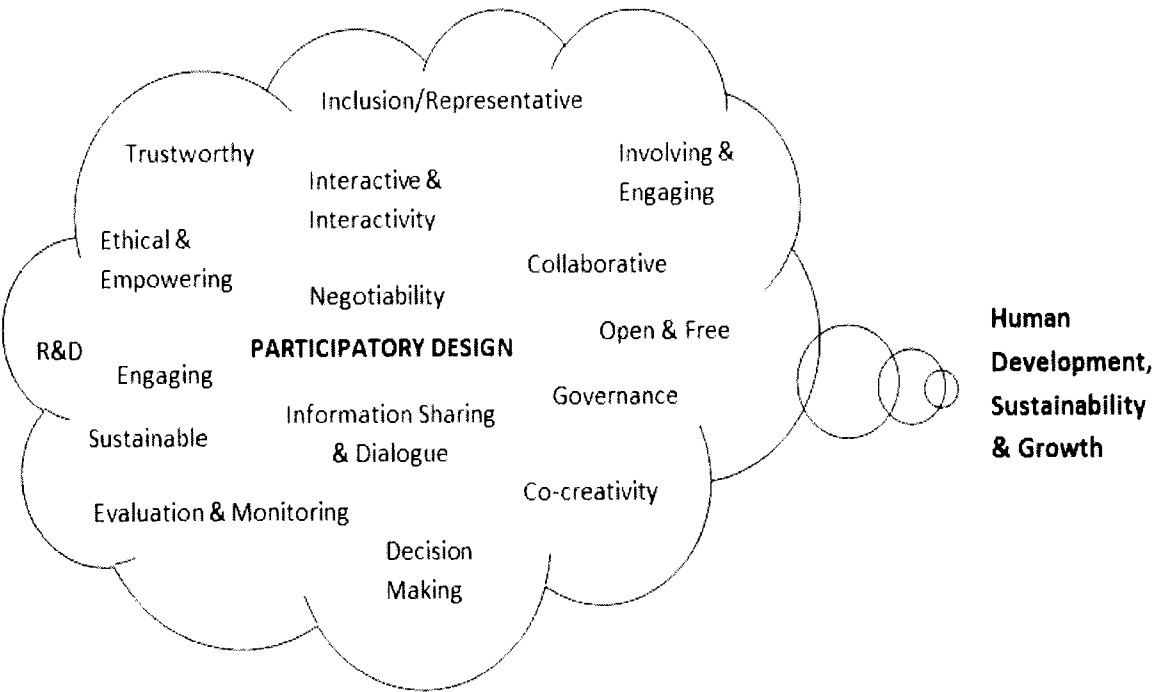


Figure 6.2: Cloud of participatory design related concepts

The word ‘cloud’ connotes that there is hardly any theorising of the variant terms beyond postulating that they are related. The arcs of the cloud portray any possible developmental direction due to a mix of the portions of PD ethics and standards. Approaches such as FLOSS, Open Development, *e-methodologies*, HCI, LL, Participatory GIS and Socially Aware software are built on varying portions of PD rudiments. Figure 6.2 shows the related concepts around PD, bounded by cultural and historical settings (Winschiers-Theophilus, 2009; Mainsah & Morrison, 2012; Merritt & Stolterman, 2012). Harvey (2011) refers to the collaborative networking and emerging new set-up of the interrelating elements as the “*architecture of participation*”.

It is also known that the different conceptual elements of PD are complex to optimise as depicted in Figure 6.2. Although literature portrays the related concepts as seemingly fitting together, they are difficult to attain, balance and implement in real practice. The difficulty also includes setting and working within optimal structures and mechanisms of inclusion and exclusion, given the different backgrounds of the participants.

To illustrate, the standard of dialogue, information sharing and negotiation require actors in PD to communicate in order to afford desired and appropriate IS designs. More specifically, critical theorists elucidate that all arguments in the public sphere have to be heard, digested,

contested and redeemed (Cukier, Ngwenyama, Bauer & Middleton, 2009). However, reaching a consensus in African contexts may not necessarily entail information-sharing, deliberation and agreement among all members. Decision-making, contrary to the idealistic principles of PD, may in reality be done by a few actors on behalf of the rest of the participating members. Thus, getting community members to talk, decide, agree or choose a course of action can be complex. Morrison et al. (2012) assert that bias in methods of selection and sampling has been a topical issue in participation research and practice. Schmidt (2004), on African civil society participation, argues that a large number of organisations and individuals are excluded from participation processes and activities due to imperfect selection processes and structures that privilege but a few.

Gate-keeping is another known complex element that requires optimisation in selecting members to act or be acted upon in PD (Andrade & Urquhart, 2012). There are possibilities of either upholding the ethics and moralities of gate-keeping (Krauss, 2012) or veiling privileging and suppressing elements of gatekeeping, project championship and guardianship (Bidwell & Hardy, 2009). The *gate-keepers* and *guardians* of a community mediate and determine who enters (does not enter); who talks (does not talk); what is (not) said; what can (cannot) be done and the extent of knowledge you acquire (cannot acquire). As a result, gatekeepers and guardians can: (1) ethically and morally sieve harmful elements; (2) be privileged by being first access points into the community; and/or (3) suppress elements that could have benefited the whole community.

The complexity of optimising PD elements often arises if the modes of action towards 'genuine' PD: (1) give a voice to the voiceless; (2) redistribute power, wealth and the means of production; (3) challenge the taken for granted assumptions; or (4) threaten positions and status held by certain social groups. It is shown from data that the people often faced with complex dilemmas and paradoxes in PD are people of power, information-privileged individuals, traditional leaders, elites, project-sponsors, externals, researchers and business people. It is generally known that practitioners deal political, delicate, emotional and complex matter when exercising PD in community organisations.

### ***6.1.3.2 The cultural, historical and futuristic reality***

Assuming that PD concepts are optimised, the next ramification is the real culture set within PD space that affords or inhibits enunciating, influencing, controlling and/or designing IS solution systems. Literature provides that the cultural, historical and political setting governs the inclusion criteria and the structure that dictates how parties may act in IS design (Byrne & Gregory, 2006). The review studies provide evidence to substantiate these claims. Bidwell and Hardy (2009) put forward that powerful people and the preferred gender have more influence and fewer restrictions in building a consensus on matters affecting the community. Chawner (2012) reveals that, even in open developments, there are groups of actors that segregate themselves to form an inner 'decisive' circle within the allegedly larger 'inclusive' group. Interestingly, Chawner identifies openness as consisting of two dimensions: product openness and process openness. In product openness, an 'open release' level implies availing of formal releases to the user community; while an 'open development' level uses interim releases as well (Ye, Nakakoji, Yamamoto & Kishida, 2005). Process openness levels comprise of open, transparent and closed process openness. An open level entails an environment where all members can participate fully in open development processes, while closed level implies that participation in certain processes are exclusive to the inner group.

While PD may elude the weak, unknowledgeable and subdued stakeholders, it may become a camouflaged tool for enriching the powerful, knowledgeable and influential. The stakeholders who are primarily fundamental in influencing and questioning the design systems, cultures, processes and products are often unaware and/or knowledge is structurally hidden from them. Schmidt (2004) hence argues that, while Africa is sleeping, the rest of the world is deliberating, debating, influencing, controlling, owning and building a consensus on policies, standards and regulations that dictate the IS universe at the World Summit on the Information Society (WSIS). In a separate account, Ahmed (2007) admits that innovations and applications are designed and developed in ignorance of the realities in African settings.

It is known from literature that aspects of what, where, when, why and how to develop IS artefacts through PD perplex both practitioners and the intended users. Human development through participation in IS design processes is a struggle of trying to get proper mixes of PD ethical conduct, standards, and checks and balances in a given context. Review studies overwhelmingly cite that the reality in African contexts is mostly characterised by poverty,

under-development and lack of infrastructures and resources. Such environmental and augmented realities shape the participants' and non-participants' strengths, weaknesses, preferences, needs and courses of action towards development.

## **6.2 What needs to be known about participatory design**

Although the investigation attained a sizable sample of literature, there are a number of aspects that scholars need to discern to fully understand and exercise PD. In particular, our analysis and synthesis of data show that many studies cut across various issues and, as such, lack in-depth discussions and conclusive results.

### **6.2.1 Reality on the ground**

#### ***6.2.1.1 Participatory design reality in developing contexts***

One of the central thrusts behind PD is to comprehend reality in developing countries. Although investigated over and over again, understanding the reality in developing contexts is and still remains critical to both practitioners and the intended beneficiaries. Practitioners usually acquire knowledge on the needs, expectations and specifications of an organisation from requirements analysis inquiries or baseline studies. Pade-Khene et al. (2010) provide an example of a baseline study that also discusses requirements and conditions of a community organisation involved in the design and use of a IS facility through a LL approach.

Following on Blake and Garzon's (2012) acknowledgement of dealing with the complex and multifaceted real problems in Africa through PD, scholars need to investigate some often ignored, political and contentious yet critical questions in order to build a credible body of knowledge. Appendix A provides some examples of questions derived from design reasoning that may be interesting to empirically investigate through both traditional and alternative paradigms. As "*scholars try to make a better world with ICTs*", they ought to also look into some 'untouchable' issues with a critical lens to get a better understanding about the reality on the ground (Rowe, 2011; 2012; Walsham, 2012).

Examples of some of the 'untouchable' issues that are vital to investigate to better understand and practice PD are as follows. According to Chango (2007), there are no absolute givens in African contexts and technology innovations. Rather, there is "*an advent that occurs*

*where previous processes get to a point of tension that creates a critical gap – the need or aspiration for something new, better or just different”* Chango (2007, p. 388). It is this critical point that the study aspires to know when community members believe and have an inner urge to go further than mediocre. Another area which is confusing but critical to know is the extent with which dominant stakeholders practise PD. The real practice of dominant parties that scholars ought to know becomes more pronounced when they are dealing with public missions and/or public goods (Aanestad et al., 2007; Ballantyne, 2009). Lastly, Ballantyne and Addison (2000), Ballantyne (2009) and Aanestad et al. (2007) argue for the need to better understand the illusive issues of PD such as financial support with/without strings attached; control and ownership; freedom and liberty to participate; and the public character of PD practice.

The general belief is that there is a great need to get more understanding of human behaviours, activities and practice in developing countries. The tendency of practitioners is that African developing communities lack resources and knowledge about their ‘true’ reality. Although discourse around the truth, development and IS/IT infrastructures is vast and continues to dominate scientific work, scholars ought to know more of African reality in accord with the economic, political, environmental and cultural complexities and drawbacks. More importantly, scholars need to know what Africans think and say about their situated reality.

#### **6.2.1.2 Research, reporting and knowledge management**

The aim of accumulating PD knowledge is to build a credible body of knowledge and sound praxis. The study presents the behaviours, actions and attributes of both practitioners and organisations as an initial step to build insight and pave avenues of what needs to be known about PD in Africa. The study juxtaposes design elements of intention, planning and communication as relating to research, reporting and knowledge management. Intention relates to the deliberate or intentional thought processes of practitioners, while planning consolidates the intentional ideal to entail putting forward working models, plans or hypotheses that formalise incorporating the community members into practitioners’ intentions and activities. Communication in design terms implies the practitioners’ verbal and non-verbal witting and unwitting enshrining of opinions, meaning and opinions in the project design, based on their worldview, experiences and understanding of the community

organisation. There are very few studies principally discuss design issues of intention, planning and communication (Table 5.3).

The IS scholarship is eager to know the quantity and quality of work on PD through compact structuring and reporting of real knowledge and best practices. It is vital to know, appraise, moot and refine the extent and quality with which practitioners frame their intentions, construct their plans and take part in dialogue with beneficiary organisations. Challenges arise when people are from different schools of thought, and use dissimilar and at times conflicting methods, methodologies, frameworks, approaches and philosophies (Rodil et al., 2012). Often researchers are more comfortable and welcoming to traditional ways of doing things rather than unorthodox means of research and practice. Yet, innovations and promising development rarely come from conforming and adherence to orthodox ways of doing things. Thus, practitioners have to research, report and publish their work so that, through PD, all the people may deliberate and critique each other on assumptions, claims and paradigms that inform practice. For practitioners need to know multiple views about the development by technologies reality since the IS scholarship in Africa is still being defined and negotiated (Morrison et al., 2012; Mosemghvdlishvili & Jansz, 2012; Ferguson et al., 2013).

### **6.2.2 Workable relationships and solutions**

Data shows that there are interplays between PD and its various elements. The PD associates include *inter alia*: e-methodologies; FLOSS; HISP; interactions; knowledge sharing and pooling; LL; open development; PCR; and PGIS. In principle, PD relates to, underlie the framing of, and/or inform the practice of the said approach or methodology. Yet, scholars on Africa hardly thoroughly investigate or completely report on the real linkages between the different approaches and methodologies.

The LL approach in studies of Pade-Khene et al. (2010), Dlodlo et al. (2008) and de Jager et al. (2012) is used illustrate what scholars need to understand about working on links amongst PD elements. By definition a LL is: an ecosystem where actors collaborate in real life (de Jager et al., 2012); a user-centric approach for open innovation (Dlodlo et al., 2008); a concept of collaboration and partnership between the public and private to co-create innovative ICT4D (Pade-Khene et al., 2010). As expected, studies discuss novel issues about community PD in Africa (Appendix C). However, evidence from data suggests that there is still room to get

more empirical data, in-depth analysis and interrogation of the relationships that exist or do not exist between PD and the LL-related concepts. In particular, scholars need to know the specific means, structures and systems of representations/agency, openness, collaboration, incorporation of user input and ideas. Information Systems scholars need to know the dynamics of group decision making, influence, control and ownership. There is more to the LL concept than what is assumed is known and more critically than is put into use. The network of LLs in Southern Africa and European Network of LLs asserts LL concept as a paradigm shift from Telecentres, Teleshops and communal computing facilities. Our quest is thus to know, assess, interrogate, publish and possibly rectify through engaging each other in a discourse on shaping PD practice.

### **6.2.3 Development and sustainability**

The ultimate objective of PD in a developing organisation is to achieve development and sustainability. The reverse relationship of development leading to participatory design also raises curiosity. Data analysis reveals that practitioners mostly look at the relationship of PD leading to development; they hardly investigate the relationship of development leading to PD. Put differently, theory suggests that the underdeveloped and underproductive people are the ones that have to be at the forefront of taking part in processes and activities of solutions that aspire to alleviate their problem domain. However, review studies suggest otherwise: that the educated, developed, productive and prosperous are highly likely to participate, control, own, influence and take advantage of the proposed solutions and systems. The previous assertion implies that development, growth and self-sustenance manoeuvres toward PD.

Schmidt (2004) provides a WSIS illustration where African civil society and their supposed representatives are failing to effectively participate. They fail to participate due to lack of information, economic means and strong 'muscle' to cooperate, build a consensus and influence decisions at international level. The strong muscle to coordinate, influence, control, design and negotiate is usually backed by productivity, growth, high quality research and development, innovative superiority, cutting edge technological advancements and, marginally, by raw materials and natural resources. Schmidt (2004) thus argues that it is the developed, prosperous and sustainable institutions that dictate the tempo in PD activities and



processes rather than the underdeveloped world. Cogburn (2004) further challenges the world to build a true equitable information ecosystem and set up active participation of the civil society to instil diversity in matters that affect everyone.

Development, growth and sustainability mean different things to different people. The road maps towards development and sustainability often differ. In addition, designing and developing such a guide, framework or path is highly contentious and complicated. Although in-depth debates about development and sustainability are outside the scope of this review; the study intends to unfold a development argument pertaining to PD. On one camp, practitioners/sponsors conceptualise and implement projects on the notion that developing institutions are 'incapacitated' and are better off with hand-to-mouth products and already-finished goods and services. In this camp, practitioners uphold and consolidate the producer-consumer/dependent/user dynamics of living and sustenance. In the second less popular camp, practitioners conceive and operationalise projects in the belief that developing organisations have the potential and/or have to have the capacity to gestate, design, produce, sustain and prosper. Practitioners of the two camps usually mix up underlying ideation and camouflage wrong concepts, assumptions and agendas. Such issues are important to know to empower developing countries to develop through PD in IS. In any given PD initiative, parties need to get insight into how specific development and sustainability currents manifest within developing settings.

To achieve sustainability, scholars are also interested in processes and activities of continued participation of community organisation in design and development. Literature shows that point PD is common and very few studies discuss continuous participation. To shift from once-off to continued participation, practitioners have to comprehend the means of attracting, retaining and sustaining the spirit and relevance of a community involved in PD.

### **6.3 How to get there**

The list of how to close identified research and practice gaps is endless. To summarise, the issues from review studies are put into three categories: (1) liberty, freedom and openness; (2) dialogue, negotiation and decision making; and (3) PD measures, assessment and build-up.

### 6.3.1 Liberty, freedom and openness

The liberty, freedom and openness measure is drawn from studies on the free and open approach. A creative commons study by Watson and McCubbrey (2009) argues that openness is the willingness to create, collaborate and share intellectual works. Data describe FLOSS and liberal approaches as movements of openness in technological use and software reuse. Liberty, openness and freedom to take part in design systems is a promising way to contribute towards building knowledge societies. Both practitioners and beneficiaries have to be open and free to: conceive of ideas; disseminate, acquire and receive information; and question and critique assumptions, claims and conjectures. Beyond the technical expertise requirements, free and open principles also requires society have the civic virtues of morality, justice and equality. To attain liberty, freedom and openness in PD and development in Africa, the researcher believe these virtues are necessities within practitioners, authority, leadership and a society. These civic virtues required in shaping and designing a liberal, free and open ecosystem are a function of history, culture, politics and socio-economic dispensation.

The ultimate goal of all IS/IT works in developing countries is to contribute to a body of knowledge and best practices that will lead towards development, growth, self-sustenance and sustainability. Data show that most practitioners and researchers cautiously put forward IS/IT as an enabler or catalyst, since such endeavours may lead to either failure or success. In particular, community PD in IS/IT process is an attempt to fine-tune solutions to achieve appropriate and promising mechanisms, tools, techniques and knowledge that can enable development, growth, self-sustenance and sustainability. The important elements drawn from review studies that shape PD are liberty, freedom and openness of both practitioners and the intended beneficiaries.

Liberty, freedom and openness help in PD cause if researchers are free to explore; investigate new topics; use both traditional and alternative paradigms; are open to interrogation; and engage in discourse on research designs and reviews. For instance, Brandt and Messeter (2004) provide an example of designing through games and play. Dlodlo et al. (2008) reveal an interactive game as a powerful mechanism to co-create freely and openly while participants have fun, make new friends and store personal documents. Morrison et al. (2012) employ mobile-based game software trials to explore uptake and use of *ad hoc* networking through

mass participation using free and open texting. Blake et al. (2001) use an alternative critical AR approach in a study on designing and developing animal tracking systems. Kendall et al. (2006) employ a *dramatistic approach* to formulate ICT policy through discourse.

### 6.3.2 Dialogue, negotiation and decision making

In reality, individuals and institutions use their liberty, freedom and openness to participate in designing and developing systems and structures that serve either self-interests or egalitarian missions. At times, the difference between selfishness/ruthlessness and true public missions is blurred. Not surprisingly, the mechanisms of liberty, freedom, proprietorship and openness in initiatives such as FLOSS and Creative Commons have been contested. Thus, the PD processes towards development have to be deliberated and negotiated to attain required designs.

The power to discuss and negotiate processes and mechanisms is important in influencing and informing the PD activities. Dialogue and negotiations have to be supported by experience, training and expertise in deliberating, influencing, controlling and owning the IS design activities. The training may be done through research, seminars and capacity building of community gatherings. Rodil et al. (2012) puts it clearly that interrelations and interactions among actors have to be continuously renegotiated, not only during the design process, but also after development and evaluation.

Of course, developing communities have to self-reflect and be sceptical of scientific explanations and solutions against the real events taking place on the ground. That way, the intended beneficiaries, together with responsible and conscious practitioners, may critically assess systems and propositions if they are appropriate and progressive or a failure. For instance, review studies discuss and expound on issues of *users, participants and actors*, yet none investigate on *non-users, non-participants and non-actors*. In Africa, there is a potential to learn more on PD if actors converse and negotiate the *things, systems and mechanisms* that ensue in non-participation of the non-users, non-participants and non-actors. Moreover, ideal PD in developing countries is about inclusion of the excluded, giving a voice to the voiceless, bringing the unrepresented to the negotiating and decision-making platform, rather than maintaining and solidifying the hegemonic structures that make PD a fallacy. Hence, one of the main characteristics of PD is its negotiability. However, in any development and

worthwhile endeavour there are limitations, forces that act against such progress and political challenges to be overcome (Mosemghvdlishvili & Jansz, 2012) or, rather, deliberated, negotiated and reached by a consensus.

Few, if any, appreciate that the PD dialogue, negotiations and decision-making for developing countries is across the board. To begin with, Table 5.3 gives a pictorial view of design aspects that developing countries have to deliberate on, negotiate and make propositions about in order to instil a culture and environment of participative productivity, sustenance and innovativeness. With regard to PD for development, growth and sustainability, developing communities and their representatives have to negotiate the following:

- Systems, structures and mechanisms of coordination, cooperation and knowledge-sharing and pooling among actors and non-actors to share wisdom and to 'participate' at all levels (Schmidt, 2004),
- Rules, standards and policies that govern and dictate operative boundaries, controlling, ownership and modes of production and competitiveness (Cogburn, 2004; Kendall et al., 2006; Thompson & Walsham, 2010),
  - General guidelines, principles and frames of reasoning in conducting, reviewing and publishing work in participatory community research and practice (Winschiers, 2006; Thinyane et al., 2007; Leinonen, Toikkanen & Silfvast, 2008; Luo, Ng'ambi & Hanss, 2010; Winschiers-Theophilus et al., 2010; 2012; Harvey, 2011; Denison & Stillman, 2012; Krauss, 2012),
- Power, structure, mechanism and tools to negotiate, to be heard, participate and ensure one's contributions to the solution design are considered or effected,
- All the said and unsaid minute and gigantic rules of engagement, operation, activity and interactivity in professional and community organisational practice that have a potential to either inhibit or afford appropriate PD. For example, elements in the liberty, freedom and openness category have to be deliberated, negotiated and decided on. Even social arrangements of open developments have to be negotiated within a context (Buskens, 2011). In certain worst scenarios, such elements are given without discussions and with no negotiations,
- To progressively participate in the sphere of things that matter and not in peripheral objects (Puri et al., 2004; Mengesha, 2010). 'Peripherality,' as described by Lave and

Wenger, “suggests that there are multiple, varied, more- or less-engaged and inclusive ways of being located in the fields of participation defined by a community” (Lave & Wenger, 1991, as cited in Davis & Jabeen, 2011, p. 22).

- Natural places, nature and/or the environment. *“The powerful representational reality spaces of technology design can occlude those interactionary moments by which [parties] experience a natural place and interrupt a fragile dialogic between land, body and movement”* (Bidwell & Browning, 2010; Bidwell et al., 2011).

In sum, even for the hyped things such as the Internet and mobile telephony, there are critical negotiations that parties have to heed (Lewis, 2005).

### 6.3.3 Participatory design measures, assessment and build-up

In any development effort, it is vital to have measures of assessing work plans and work about to be done, and to reflect on what is happening in relation to what is supposed to be happening. In design thinking, tools such as plans, blueprints and designs, are used not only to assess conformity to befitting guidelines, but they also measure reality on the ground against the ideals. About the present topic, data show vast measures for PD summarised in Appendix B. The measures attest to participation degrees and extents. Probably, with the exception of studies on evaluative PD, the study believe developing environments still have to qualify and provide more insight on how to assess, ‘quantify’ and/or gauge the act of PD. The quest is not about exact measurements, but it concerns the drive towards sincere assessment of activities, structures and systems. Participatory design can be improved by getting useful knowledge through estimation and gauging, of even the immeasurable items like assertiveness, reflexivity and consciousness.

Traditionally, measures have to include tangibility and some ‘objective’ mechanism or standard that of course would have been communicated, critiqued, negotiated, contested and later validated as ‘objective’. Participatory design phenomenon measures in developing community organisations, as evident in review studies, are largely ‘subjective’ with little to no way of getting tangible impact units except assessments resting on beliefs, faith and many intangibles. The main point is that to build up systems for development, community organisations, together with the rest of the organisations, have to have measures to assess and evaluate their acts, contributions, realisable development and growth and acts of other

stakeholders. If practitioners cannot prudently measure and build up from the current practice, be it positive or negative, then PD is bound to be one of the much talked about yet useless phenomena. For instance, the LL approach provides guidelines of developmental innovating and inventing through measurements, assessments, re-designing and re-building while in use. In other word, stakeholders alike are bound by a PD ethical conduct to measure and assess, so as to correct, consolidate and build up from their given position towards continuous improvement of systems, spaces and/or settings. Thus, a LL by definition means designing and development through live *assessment, measuring, correcting, consolidating* and/or *building-up* of systems within a given setting.

#### **6.4 Summary of discussions and implications**

There are several means used to conceive and implement community PD in African settings. Such diversity brings with it richness as well as misunderstandings in the use and practice of PD phenomena. It follows also that the form and nature of community PD with which a practitioner engages affect the extent of a practitioner's work. On that note, the researcher separated the discussion of the results into three categories consisting of what is known, what needs to be known and how to achieve the desired objectives by PD. Drawing from the research findings, the researcher argues for and against what is known about PD and human development. In addition, PD is given as coercive and value-laden by its nature of raising ethical and moral issues of zero-sum politics and equality. It is therefore given that PD is a complex phenomenon. The researcher argues that there is a potential to use PD to understand the reality on the ground, devise workable solutions and work towards development and sustainability. Freedom and openness and dialogicality are some of the measures that can be used to achieve PD goals. Lastly, the table below summarise the research findings.

Table 6.1 Summary of implications

Aspect	Brief Discussion of the Aspect	Implications
What is known	PD can lead to community development.	<ul style="list-style-type: none"> <li>• PD may in reality ultimately lead to growth and development.</li> <li>• Alternatively, development and prosperity affords greater participatory designing.</li> </ul>
	PD connotes power and control dynamics.	<ul style="list-style-type: none"> <li>• PD entails giving power, ownership and control over decision making and sharing of information on enacting systems that surrounds us.</li> <li>• PD ushers in coercive tools and mechanisms to determine one's destiny.</li> <li>• PD may be viewed by social groups as a zero-sum game, meaning a gain to some is associated with a loss to some.</li> </ul>
	The complexity of the practitioner's duty to serve the interests of the intended beneficiaries. Responsible acting in the best interest of the intended beneficiaries Putting intended beneficiaries' interest above personal and sponsoring firm's interests	<ul style="list-style-type: none"> <li>• Genuine acting in the best interest of the intended beneficiary community</li> <li>• Suppressing of potential development that could have been in the best interest of the intended beneficiary community</li> <li>• Simple systematic development or underdevelopment of the community due to PD</li> <li>• Gradual progression or worsening of the cultural and historical heritage of a community by PD</li> </ul>
What needs to be known	What is really happening on the ground? Working and unworkable solutions	<ul style="list-style-type: none"> <li>• Reporting and sharing of both positive and negative results on PD from African contexts</li> <li>• Best tools and techniques of observing, recording, disseminating and learning in PD research and practice</li> <li>• To reflect, interrogate and build from reality on the ground in order to work towards best practices</li> <li>• The ways of enacting PD to enable sharing of knowledge and means of production and building together systems of development and sustainability</li> </ul>
How to get there	In accordance with PD ideals, there have to be mechanisms of freedom and openness to act (be acted upon). Communicative, negotiable and decisive	<ul style="list-style-type: none"> <li>• Open and free to interact with others in order to share knowledge, trade goods and services</li> <li>• Synergic operating and team spirit in tackling serious problems</li> <li>• Peer review, assessments, feedback and development of different modes of PD</li> </ul>

## 7. Conclusions

### 7.1 Reflections

The first stage of knowledge and practice representation is to choose a conceptualisation (Östman, 2007). The identified conceptualisations are rudimentary plans, designs and/or arrangements of art, form, space, mass and patterns. Review studies provide evidence that PD manifests in a number of related aspects. Data reveal that participatory designing in IS development may be preparatory stages for work, or it may broaden to include integrative elements of systems-in-use and finished work. Literature has vast, intriguing and incoherent conceptualisations, upon which practitioners reason and interrogate about the past and current events, and speculate about futuristic missions on participatory designing and development in African settings.

Review studies also show that the related aspects are used freely with minimal to no differentiation of the terms. For instance, closely similar terms such as engagement, involvement and participation are used interchangeably in review studies. The same applies to the prefixes that identify a social group, such as users, community, locals, public and indigenous terms that are interchangeably used across review studies, yet are conceptually and operationally different. Consistent and coherent use of terms matters to research and practice, in that topics, questions and approaches relating to one social group may be far different from another. For instance, although scholars bunch *user* participation with *community* participation, there is a large difference between what characterises *users* and a *community*. Users imply people who use an artefact, while an African community consists of concerned, well-wishers and decisive people who may or may not be users. As discussed, because of culture, politics, history, family structures and societal norms, traits and values, *non-users* within a community organisation may in certain cases be more participative in the design and development of the system than the actual *users*. This philosophy of being immensely dissociates the way African communities take part (or ought to) in ISD.

Data show that aspects of community participation phenomenon seen through the lens of DS are diverse and discussions are novel. DS principles reveal that elements of PD are intertwining in nature and complex, as is the process of researching, practising and reporting



it. Evidence of the connection between DS practice with the problem environment through the specification of requirements and field testing in Africa support Hevner's (2007) *relevance cycle*. Further, within DS research and practice, the *design cycle* links building and evaluating of design artefacts and processes (Table 5.3). About *rigor cycle*, review studies show a connection of DS research and practice to grounding and development of knowledge bases. All in all, organisational transformation through community PD is made salient to both research and practice, as indicated by the relevance and rigor of most review studies.

The study also attempt to contribute to the body of knowledge by using DS principles underpinned by critical philosophy to synthesise and reflect on how: IS artefacts are conceived in a community organisation; and stakeholder 'utilities' are realised, presented, represented and contested, and forged into context-conscious IS designs. Traditionally, enquiries on pragmatism, change, intervention, action or practical problem-solving within the IS discipline follow the AR method (Baskerville, 1999; Baskerville & Pries-Heje, 1999; Baskerville & Wood-Harper, 1996; Grant & Ngwenyama, 2003). However, recent investigations on the topic have adopted the DS approach (Vaishnavi & Kuechler, 2007; Sein et al., 2011; Peffers, Rothenberger & Kuechler, 2012). Not surprisingly, there are debates on whether AR is similar to, or differs from DS (e.g. livari & Venable, 2009; Papas, O'Keefe & Seltsikas, 2012). Others such as Sein et al. (2011) assert that AR and DS can be combined to form Action Design Research. Nonetheless, scholars use the tangible and intangible ideals of design construct proposed by McKay et al. (2012) as the basis for the present review of community participation in developing countries. IS scholars believe the tenets of DS are scientifically sound and compatible enough to be used to hypothesise and/or evaluate PD work.

Parallel to investigating these rudimental issues, the study asks how practitioners attempt to practise and/or reveal the different aspects associated with community PD. The review study attempts to map out the different categories that are similar to community participation in ISD. Community participation may have been practised in ISD in either one or more of the following forms: as a means to solve a problem; a product in itself; a process or action towards a certain goal; an intentional activity, either wittingly or unwittingly; a conscious plan/situational plan; a way to communicate; to share/learn from experiences; to bring

about, measure values; a practice; and/or a service to the community and society (McKay et al., 2012).

## 7.2 Future work

Results shown are broad and discussions provided are by no means complete or in-depth, given that this is an exploratory work, delineating characterisations and manifestations of PD phenomenon in Africa. However, reflections on the review studies engage with issues of ethics, reality and responsible practice, evoked by Stahl (2012) in the European Journal of Information Systems editorial and Walsham, (2012) in the Journal of Information Technology (JIT). Stahl (2012) brings up relevant and yet challenging issues of whether Information Systems scholars are researching and innovating responsibly. Are scholars being true and responsible 'ambassadors' of the better society through ICT's promise, by the way they apply theories, methodologies and approaches? How true/responsible are practitioners working in developing settings, in discussing/revealing the issues of norms, ethics, morality, law and customs, prescriptions and proscriptions to fellow researchers and, more importantly, to those often obscured from 'reality', i.e. the marginalised, illiterate, powerless, or the bottom billion? The present review study reflects on the thinking of these questions of responsibility and accountability expected from IS scholar practising in development settings (Stahl, 2012).

Walsham (2012) contemplates on whether IS scholars are making a better world with ICTs. Similar to Stahl (2012), Walsham (2012) interrogates critical yet contentious agendas. Initially, the researcher learned that beyond the need for the core/identity debate, it is ideal to study fascinating and topical research areas/questions, bearing in mind that IS is a trans-disciplinary field. Drawing on this conjecture, the researcher believes that the phenomenon under present review is topical; issues raised are fascinating to such an extent that either very few practitioners responsibly report what is on the ground or some choose to conceal valuable knowledge (of success or failure) that can awaken new horizons. Walsham later poses questions of the subject matter IS scholars ought to look into. Having looked at a number of aspects on subject matter, Walsham (2012, p. 89) rightfully puts it as follows:

*IS scholars and practitioners should be concerned with how to [design, develop, evaluate and] use ICTs to help make a better world, where everybody has the*

*opportunity and capability to use technologies to make better lives for themselves, their communities and the world in general.*

In this review, the researcher attempts to think critically of PD by considering not only what is wrong with this world, but also what is right about it, and challenging existing orthodoxies, approaches and hierarchies so as to *infer* into the future. The desire is to analyse in what ways community PD has a stronger ethical agenda of making this world better. Lastly, on methodologies, Walsham (2012) advocates for the openness to multiple methodologies, including DS, especially in teaching, research, practice and publications in top journals. Application of DS principles, instead of the traditional Action Research principles, is thus meant to open up new insights and new possibilities, not only for practitioners but also for the rest of organisational community members.

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## Appendix A: Description of Design Science framework aspects derived from McKay et al. (2012)

Design as a ...	Reconciling Design Science principles & elements and community participation ideals
Problem-solving	<p><b>Brief description:</b></p> <p>How the research and practice of <i>participation of a community organisation (phenomenon under review)</i> transform or improve the environment, orientation of solution, finding of solutions to a problem domain and how the solutions are implemented.</p> <p><b>Potential aspects of interest to this review:</b></p> <p>How does, if any, <i>community participation</i> unveil multiple perspectives of what constitutes the field problem and foster the emergence or revival of the solution provided?</p> <p>How do practitioners and <i>community members</i> take part in co-creating a new (changed) social-technical reality to resolve a problem?</p> <p>How does the <i>participation of the community</i> in activities of a generic solution to a problem type encapsulated in an ISD application package morph into a designed and implemented solution that has the characteristics of utility and desirability and meet a range of economic, social, cultural, political and organisational objectives?</p>
Product	<p><b>Brief description:</b></p> <p>The means with which artefacts arise within a specific social, cultural and historical context and the role <i>community members</i> play in imbuing meaning and giving form to a solution, of a product to meet certain needs within an environment.</p> <p><b>Potential aspects of interest to this review:</b></p> <p>How do stakeholders seek/enforce alignment between the problem and solution as evidenced in the IS artefact and the problem(s) and possible solutions, as perceived by <i>community organisational members</i>?</p> <p>How does the social, cultural, political and historic <i>community organisational context</i> shape and influence the implemented realisation of the previously designed IS artefact?</p>
Process, Action	<p><b>Brief description:</b></p> <p>How <i>community members</i> take part in the processes and actions that lead to the realisation and implementation of an artefact in a specific context. Thus, this aspect involves the ways in which <i>community members</i> are engaged in decision making, action taking and change activities that lead to both the realisation of the artefact and the embedding of that artefact in the context of use.</p> <p><b>Potential aspects of interest to this review:</b></p> <p>How do <i>participation of the community organisation</i> in co-creating an IS artefact evolve? Are there particular practices and processes that are more conducive to</p>

	<p><i>engage community members</i> so as to commit constructing germane products?</p> <p>If project managers, analysts or designers adopt a <i>community PD</i> attitude rather than an orthodox practitioner decision attitude throughout the process of both realising and implementing a solution, can better outcomes be achieved?</p> <p>How might a <i>community PD</i> attitude change the processes and activities involved in managing and sustaining an IS artefact?</p>
Intention	<p><b>Brief description:</b></p> <p>The intentional or deliberate thought processes of practitioners to involve <i>community members</i> so that they take part in enabling practitioners to see connections between problematic areas and possibilities, intuition and hunches, and reasoned (well-informed) problem-solving. Formulation and construction of creative development artefacts occur when both ends, practitioners and intended <i>beneficiary community</i>, have the intent to co-operate. Of course complexities arise, not only when practitioners' intentions are entangled in the engagement activities. but also when intentions of problem owners and intended beneficiaries of the solution (i.e. <i>members of the community</i>) are.</p> <p><b>Potential aspects of interest to this review:</b></p> <p>How do ISD practitioners' intentions become evident to relevant stakeholders, especially weak stakeholders such as <i>community members</i>? Is it through <i>involvement of the community members</i> in a discourse, plans, models and other forms of representations?</p> <p>How do the intentions and requirements of the <i>community members</i> become evident to ISD practitioners?</p> <p>How do these implications then shape and impact the work of the ISD practitioners or solution conjectures to the problem owners, i.e. <i>community organisation</i>?</p> <p>Will an ISD be used as intended if the meanings ascribed to the IS artefact are in accordance with the intentions of the practitioners and the relevant but weak stakeholders, i.e. <i>community members</i>?</p>
Planning	<p><b>Brief description:</b></p> <p>Consolidating on an intentional ideal, planning constitutes putting forward working models, plans or hypothesis that consciously formalise incorporating the <i>community members</i> into practitioners' intentions or activities.</p> <p><b>Potential aspects of interest to this review:</b></p> <p>What are the processes by which ideas are generated in engaging with <i>community members</i>, captured as plans, models, sketches? How does the design of the desired future state emerge and co-evolve from these interactions?</p> <p>How well do emergent plans and models align with the intentions of ISD practitioners and <i>community members</i> and how might it be possible to achieve and ensure greater shared understanding and alignment of those models?</p>
Communication	<p><b>Brief description:</b></p> <p>At times, practitioners knowingly or unknowingly enshrine human values and opinions</p>

	<p>in the project design, basing on their worldview, experiences and their understanding of the <i>recipient community</i> for which the project is intended. A project resonates with the <i>recipient community</i> when it appeals to their interests, values and attitudes, and in this way communicates with the intended audience, i.e. the <i>community</i>. The conceptual characteristics embodied in the project thus serve to communicate with the <i>community</i>. This communication that enables <i>community members</i> to reconstruct meaning and to associate with the form and possibilities derivable from project depends on certain contacts that initiate <i>engagement of the community</i>.</p> <p><b>Potential aspects of interest to this review:</b></p> <p>How do ISD designers ensure that the realised artefact communicates with <i>community members</i> as intended? Does any form of <i>community participation</i> play a role in personifying this communication?</p> <p>How do <i>community members</i> reconstruct meanings, and how has <i>taking part of the community members</i>, as intentionally designed by ISD practitioners, ensured that these reconstructed meanings are in accordance with their intentions?</p> <p>Do claims from <i>community members</i> that an ISD project does not meet their requirements result from a lack of correspondence between the ISD practitioners' intentions, and constructed meanings of <i>community members</i>, as mediated via the IS artefact?</p> <p>How do ISD practitioners influence the interpretations of <i>community member</i> stakeholders? How are intentions communicated via IS artefacts to <i>community members</i> or vice versa?</p>
Experience	<p><b>Brief description:</b></p> <p>The range of experiences (both manifest and latent) created for and received by the <i>intended beneficiary community</i> of a project, the meanings and experiences a <i>community member</i> constructs with an artefact over time.</p> <p><b>Potential aspects of interest to this review:</b></p> <p>How can <i>community participation</i> explicate notions of <i>community member</i> experiences in the context of an IS, before, throughout and following the organisational implementation of the project and attendant organisational changes?</p> <p>In what ways could ISD designers ensure that the <i>community member</i> experience becomes more satisfying, intelligent and meaningful through their design activity?</p> <p>How do <i>community member</i> respond to cues, features and functionality embedded in a ISD system, and thus how close is the match between the manifest functions, the appropriation of the project system, and hence the latent meanings ascribed by <i>community members</i> within a particular context?</p>
Value	<p><b>Brief description:</b></p> <p>The value (often of symbolic, iconic, and/or social stature) placed on the artefact and the experiences of that artefact by a <i>community member</i>, and how this changes over time. An interesting alternative position is to consider the value(s) that is both designed into artefacts and services, and that may emerge when the <i>community interacts</i> in the</p>

	<p>implementation, use and evaluation of such artefacts. These emergent values may or may not reflect the practitioner's intentions, and may have impacts (positive and negative) both on direct users of the artefact and indirect stakeholders, i.e. <i>community members</i>.</p> <p><b>Potential aspects of interest to this review:</b></p> <p>In <i>engaging the community</i>, what contextual factors might contribute to different perceptions of value being ascribed to an IS artefact?</p> <p>In <i>engaging the community</i>, are there predictive events, triggers or trajectories that lead to positive or negative value being ascribed to the implemented IS artefact?</p> <p>Is there symmetry between the value ascribed by the designers, and that ascribed by the <i>community members</i>, as key stakeholders?</p> <p>How does the value ascribed by the <i>community</i> change over time as their experience of using the IS artefact increases and given their experiences in the environment in which the problem lies?</p>
Professional Practice and Community Organisational Practice	<p><b>Brief description:</b></p> <p>The broad responsibilities and activities of practitioners (on the ground and/or in academics) who inevitably strive to change the world through their actions, attitude towards a 'wicked problem,' consideration of the knowledge and skills required to develop the lifeworld of a <i>community organisation</i> through ICTs.</p> <p>Also, interlinked to the professional practice are the broad responsibilities and activities of <i>community members</i> who strive to transform their lifeworld through their actions, attitude towards a 'wicked problem,' consideration of the external knowledge and skills required to <i>take charge</i> of their world, with or without the help of ICTs.</p> <p><b>Potential aspects of interest to this review:</b></p> <p>How do good practitioners (designers, developers, researchers, project managers, implementers, evaluators, etc.) <i>engage</i> both with the perceived problem or need within a <i>developing community setting</i>?</p> <p>How do practitioners <i>engage</i> successfully with <i>community members</i>; how do practitioners come to appreciate the perceptions and experiences of <i>community members</i>; and how do they come to appreciate the economic, cultural, political and ethical aspects of social forces operating in the project setting?</p> <p>How do <i>community members</i> <i>engage</i> successfully with practitioners; how do <i>community members</i> come to appreciate the perceptions and experiences of practitioners; and how do they come to appreciate the economic, cultural, political and ethical aspects of the social forces operating in the project setting?</p> <p>How do practitioners and/or <i>community members</i> manage the resultant value conflicts and ambiguity?</p> <p>What changes to professional practice would ensue if ISD practitioners were to view <i>community organisation</i> (key but weak stakeholder group) as co-designers and co-creators of the ISD project solution to an organisation context?</p> <p>What changes to <i>community organisational</i> practice would ensue if <i>the community</i></p>

	were to view practitioners as dominant and resourceful stakeholders in IS artefact co-creation, yet practitioners are neither the problem owners nor intended beneficiaries (with exception of contributing to knowledge base)?
Service	<p><b>Brief description:</b></p> <p>Taking <i>community participation</i> activities to provide a service, as non-aesthetically motivated service, rather than heroism, the highly creative, innovative and bold heroic individual, who manages to turn design of a product with various aesthetic values into an outlet for personal expression. View on a <i>community participation</i> activity as a sustained service, a methodical day-in, day-out solving of problems, rather than with the constant ferment of irrelevant choices exercised by the loner hero-practitioner. Thus viewing <i>community participation</i> as a service entails day-to-day problem-solving, ability to understand and help others resolve or ameliorate problems, mindful of contextual forces and constraints</p> <p><b>Potential aspects of interest to this review:</b></p> <p>How is <i>community participation</i> employed by ISD practitioners to understand the problems as experienced by <i>community members</i> and the objectives in seeking resolutions so that the service desired by <i>community members</i> can effectively be designed and delivered?</p> <p>How are on-going modifications and enhancements consonant with the original intentions of ISD practitioners and <i>community members</i> and with perceptions of the value associated with the ISD implementation?</p>



## Appendix B: Comprehensive Literature Search Procedure

The initial point of searching is pertinent databases:

*ScienceDirect, EBSCO, Google, IEEE Xplore, Web of Science, The ACM Digital Library*

A second source, of high-ranking journal outlets in IS research and practice:

*MIS Quarterly, Information Systems Research, Communication of ACM, Management Science, European Journal of Information Systems, Journal of Management Information Systems, Decision Support Services, Information Systems Journal, Information and Management, Journal of Strategic Information Systems, Journal of the Association for Information Systems, Journal of Information Technology*

Heeks' (2010) ranking of 15 ICT4D journals largely focused on African:

- *Information Technologies and International Development*
- *Electronic Journal of Information Systems in Developing Countries*
- *Information Technology for Development*
- *African Journal of Information and Communication*
- *International Journal of Education and Development Using Information and Communication Technology*
- *Asian Journal of Communication*
- *Journal of Health Informatics in Developing Countries*
- *Information Development*
- *International Journal on Advances in ICT for Emerging Regions*
- *African Journal of Information & Communication Technology*
- *South African Journal of Information Management*
- *African Journal of Information Systems*
- *International Journal of Information Communication Technologies and Human Development*
- *Asian Journal of Information Technology*
- *Asian Journal of Information Management*
- *International Journal of ICT Research and Development in Africa*

Other potential sources of literature that deal with PD include:

- *Proceedings of the PD Conference*
- *Proceedings of the Designing Interactive Systems Conference*
- *Proceedings of IFIP INTERACT Human-Computer Interaction*
- *Human-Computer Interaction*
- *The Journal of Computer Supported Cooperative Work*
- *International Journal of Human-computer Studies / International Journal of Man-machine Studies*
- *Interactions*
- *Behaviour & Information Technology*
- *ACM Transactions on Computer-human Interaction*
- *User Modelling and User-Adapted*
- *Interaction Design Foundation*

## Appendix C: Defining Participatory Design dimensions of the review articles

Similar to MISQ review study by Jasperson et al. (2002), this appendix provides excerpts from review studies that define dimensions related to PD phenomenon.

### Aanestad et al. 2007

<i>Participation theme:</i>	Building spatial data infrastructures
<i>Related constructs:</i>	Representation, openness, sharedness, involvement, engagement, negotiation
<i>Construct definition:</i>	Representation, given the <i>political nature of representation</i> , denotes privileging certain actors over others due to structuring and coordination mechanisms of discouraging, inequality and lockout.
<i>Actors/Stakeholders</i>	Institutions, individuals, markets,
<i>Participation measures</i>	Joint activity, public good (open and shared), equality, inequality, not providing equal opportunities for all
<i>Participation degrees</i>	Full control, top-down orientation, down-up orientation, joint, open, equal for all, shared

### Ahmed, 2007

<i>Participation theme:</i>	Bridging the digital divide by building open access
<i>Related constructs:</i>	Openness,
<i>Construct definition:</i>	Openness, within the <i>open access movement</i> , means free and open getting and distribution of information, knowledge and/or source code
<i>Actors/Stakeholders</i>	Authors, copyright owners (Publishers), African scientists, users,
<i>Participation measures</i>	Digital opportunity index (doi), open, copyright, copyleft
<i>Participation degrees</i>	Open, free for all, unrestricted distribution, perpetual right of access, equality, inequality

### Andrade and Urquhart, 2012

<i>Participation theme:</i>	Structuring and building political liberties in ICT4D projects
<i>Related constructs:</i>	Freedom and political Liberties
<i>Construct definition:</i>	Political liberties are about the right of people to decide on who is going to be granted the decision-making power and under what principles, as well as their right to freely express their views
<i>Actors/Stakeholders</i>	ICT4D sponsors, Users (alleged beneficiaries)
<i>Participation measures</i>	Non-hegemonic participation in designing rules, procedures and structures governing information creation, storage and distribution
<i>Participation degrees</i>	Hold control (ICT4D Sponsors), Gain little autonomy (Users)

**Anokwa et al. 2009**

<i>Participation theme:</i>	Human-Computer Interaction for Development
<i>Related constructs:</i>	Participation and control
<i>Construct definition:</i>	Participation refers to involvement of target user community in the design and conception of the project.
<i>Actors/Stakeholders</i>	Researchers, partner agency, individuals, community organisation
<i>Participation measures</i>	Informative responses, intelligences
<i>Participation degrees</i>	Strong participation, weak participation

**Awotwi et al. 2011**

<i>Participation theme:</i>	Dialogue and Representation between the public and government through Mobile GOVernance Strategies for Development (MGOV4D)
<i>Related constructs:</i>	Governance, Participation, Dialogue
<i>Construct definition:</i>	'Development as a freedom' implies to participate in, negotiate with, influence, control and hold accountable the institutions that affect their lives.
<i>Actors/Stakeholders</i>	Individual Groups, Institutions, Individuals
<i>Participation measures</i>	Freedom and enabling environment to participate in governance activities: good governance
<i>Participation degrees</i>	Ascertaining people's preferences; formulation; implementation; monitoring, evaluating and ensuring

**Aynekulu et al. 2006**

<i>Participation theme:</i>	Understanding land use and degradation to institute proper land management (land rehabilitation) using PGIS
<i>Related constructs:</i>	Governance, Participation, Dialogue
<i>Construct definition:</i>	(same as in <b>Awotwi et al. 2011</b> )
<i>Actors/Stakeholders</i>	Institutions, Individuals (Head porters)
<i>Participation measures</i>	Freedom and enabling environment to participate in governance activities: Good governance
<i>Participation degrees</i>	(same as in <b>Awotwi et al. 2011</b> )

**Ballantyne and Addison, 2000**

<i>Participation theme:</i>	Ordering, structuring and managing the Internet through decentralisation, participation and cooperation
<i>Related constructs:</i>	Cooperation, decentralisation
<i>Construct definition:</i>	Cooperation is about relationships, the give and take among partner organisations, [individuals, communities and societies]
<i>Actors/Stakeholders</i>	'Communities of interest', Institutional organisations
<i>Participation measures</i>	Non-identifiable

*Participation degrees* Self-standing (LEAST cooperation); Functional collaboration Partnership (STRONG cooperation).

### **Ballantyne, 2009**

*Participation theme:* Building, structuring and emerging innovative systems of sharing, accessing, collaborating and interrelating agricultural knowledge

*Related constructs:* Knowledge generation, sharing, storage and application

*Construct definition:* Innovation is a process of generating, accessing and putting knowledge into use, are the interactions of different people and their ideas, and the social setting of these interactions and relationships.

*Actors/Stakeholders* Individuals, groups, organisations, governments

*Participation measures* Openness, inclusiveness, collaborative

*Participation degrees* Linear vs. non-linear paradigms of knowledge creation

### **Belliethathan et al. 2008**

*Participation theme:* Key thrust areas of Electronic Environment Governance Platform

*Related constructs:* Interactive participation

*Construct definition:* Interactive participation is the opportunity for citizens to provide input to the agency online; the ability to comment on regulations online, and the ability to communicate with other citizens online on issues.

*Actors/Stakeholders* Institutional (Government, citizens, Businesses, Private sector)

*Participation measures* Enabling environment and e-environmental governance platform for a knowledgeable nation and various institutions to collaborate

*Participation degrees* Active encouragement and engagement, effective participation, effective coordination

### **Bidwell and Browning, 2010**

*Participation theme:* HCI Design beyond traditional foci of work and civic settings

*Related constructs:* Designing, interactions

*Construct definition:* The affordances of natural places may inspire designing interactions that improve people's health and capacity to focus, perform work and relate interpersonally or to address ideals of ecological sustainability.

*Actors/Stakeholders* Designers, inhabitants and visitors of natural/wild places, urban people, farmers, settlers, villagers, indigenous people

*Participation measures* Designs representative, reflective and affective of the 'wilderness' and natural places of the rural settings

*Participation degrees* Real and virtual engagement; Participate knowingly; Cognitive and Physical engagement

### **Bidwell and Hardy, 2009**

<i>Participation theme:</i>	Participation in design processes
<i>Related constructs:</i>	Local participation - primary orality and performance
<i>Construct definition:</i>	Orally transmitting knowledge, directly and without recording, involves constantly recreating, accumulating and dividing it across a group according to immediate factors, social systems and protocols, and power relations
<i>Actors/Stakeholders</i>	Designers, indigenous people,
<i>Participation measures</i>	Responsiveness, awareness, consciousness; representative, reflective and affective of the 'wilderness' and natural places,
<i>Participation degrees</i>	Dichotomous views of inclusion: traditional knowledge ... can both empower and corrupt knowledge; full participation

**Bidwell et al. 2011**

<i>Participation theme:</i>	Designing digital systems
<i>Related constructs:</i>	Interactions
<i>Construct definition:</i>	Interactions refers to taking part in recording and interpreting processes during knowledge sharing in a system design. Interaction is 'a form of meaning-making in which the artefact and its context are mutually defining and subject to multiple interpretations'.
<i>Actors/Stakeholders</i>	Users, designers
<i>Participation measures</i>	Reflection on self and own narratives, distributed platforms and inexpensive devices, Subject to multiple interactions,
<i>Participation degrees</i>	Speech, gesture and bodily interaction,

**Blake and Garzon, 2012**

<i>Participation theme:</i>	Reviewing 'boundary objects'
<i>Related constructs:</i>	Participation, boundary Objects
<i>Construct definition:</i>	Boundary objects are devices and methods that allow acting in situations of incomplete knowledge, nonlinearity, and divergent interests.
<i>Actors/Stakeholders</i>	Local users, researchers,
<i>Participation measures</i>	Poverty measures/indexes
<i>Participation degrees</i>	Genuine participation

**Blake and Tucker, 2006**

<i>Participation theme:</i>	Socially aware software engineering
<i>Related constructs:</i>	Participatory, Socially Aware Design
<i>Construct definition:</i>	Socially aware software engineering entails user-centredness and participation since it involves the target community in the entire software development process.
<i>Actors/Stakeholders</i>	Researchers, students, trackers

*Participation measures* Outcome mapping and the real access/real impact criteria

*Participation degrees* Full participation

### **Blake et al. 2001**

*Participation theme:* Design of animal trackers system

*Related constructs:* Awareness, recognition

*Construct definition:* Context awareness relates to the ability of a computer system to sense and react to its environment.

*Actors/Stakeholders* Expert trackers, semi-literate trackers, users, researchers

*Participation measures* The success of the intervention can be judged by the impact on the users who have been recognised as experts in their field.

*Participation degrees* Full 'context aware'

### **Braa and Hedberg, 2002**

*Participation theme:* Reconstruction, restructuring and development of HIS

*Related constructs:* Cultivation (standardisation, flexibility and localisation), decentralisation and participation

*Construct definition:* Cultivation means a slow, incremental, bottom-up process of aligning actors by enabling translation of their interests and gradually transforming social structures and information infrastructures where the resources are already available from the base.

*Actors/Stakeholders* Human and non-human entities

*Participation measures* 'Localisation' and flexibility for local change, cooperation, diffusion, comparisons and interchange of ideas with other network actors.

*Participation degrees* Full access to the development team (a meritocratic approach).

### **Braa, 1996**

*Participation theme:* Exploring IT for empowerment and development through PD tradition

*Related constructs:* Community participation

*Construct definition:* Community participation entails involving the community in both the health care system and as participants in the system development process.

*Actors/Stakeholders* Human and non-human entities

*Participation measures* Multi-levelled involvement of community members and activities

*Participation degrees* Real user involvement, close user participation

### **Brandt and Messeter, 2004**

*Participation theme:* Developing, negotiating and expressing a shared understanding of users, use contexts and technology

*Related constructs:* Collaboration

<i>Construct definition:</i>	Collaboration entails interaction and/or engagement among stakeholders across competences, interests, responsibilities and perhaps professional languages to generate, communicate, and share ideas and to negotiate roles and interests, openness.
<i>Actors/Stakeholders</i>	Users, potential users, partners, designers and developers
<i>Participation measures</i>	Discovery of various design aspects
<i>Participation degrees</i>	Active engagement, constructive dialogue

**Breytenbach et al. 2012**

<i>Participation theme:</i>	Active increase in freedom towards sustainable development through ICT4D projects
<i>Related constructs:</i>	Ownership, control
<i>Construct definition:</i>	Ownership and control entails 'increase of an entity's freedom'.
<i>Actors/Stakeholders</i>	Local communities, non-local benefactors, researchers,
<i>Participation measures</i>	Freedom and enabling environment to participate: increase in freedom and good governance
<i>Participation degrees</i>	Active increases in freedom, direct and indirect increase in freedom

**Brown et al. 2012**

<i>Participation theme:</i>	Design of Water Alert
<i>Related constructs:</i>	Citizen Involvement, participation
<i>Construct definition:</i>	Citizen Involvement and participation in this context entails including of citizens in designing, evaluating and prototyping of Water Alert initiative
<i>Actors/Stakeholders</i>	Low-income and low-literate residents, informal or rural settlements
<i>Participation measures</i>	Application design inclusive, incorporative and representative of diverse social groups of people
<i>Participation degrees</i>	Direct involvement and participation, direct communication

**Buskens, 2011**

<i>Participation theme:</i>	Open Development
<i>Related constructs:</i>	Openness, closures
<i>Construct definition:</i>	Open ICT ecosystems provide the space for the application and transformation of social activities that can be powerful drivers of development
<i>Actors/Stakeholders</i>	Role players, women, practitioners, researchers, policy makers
<i>Participation measures</i>	Openness measures conscience of power relations, inequalities, marginalisation
<i>Participation degrees</i>	Restricted access, restricted participation, active and in-depth participation



**Byrne and Gregory, 2006**

<i>Participation theme:</i>	Design of Community-based HIS
<i>Related constructs:</i>	Co-construction, participation
<i>Construct definition:</i>	Co-construction means reciprocity of meaning and mutual construction of shared ground for the public to feel comfortable to participate, share understandings and reflect on the dialogue with various parties.
<i>Actors/Stakeholders</i>	Individual groups (subordinate, dominant), divergent parties
<i>Participation measures:</i>	Respecting of opinions; exchanged views freely, participatory determination, control and ownership
<i>Participation degrees</i>	Equality in discussion, freely exchange views, Free of coercion, allowed to question, free to introduce any assertion

**Byrne and Sahay, 2007**

<i>Participation theme:</i>	PD for Social Development
<i>Related constructs:</i>	PD
<i>Construct definition:</i>	System design represents a social process of negotiation among people's different needs, expectations and worldviews, so as to develop a shared understanding of their own and each other's interests, perceptions and roles.
<i>Actors/Stakeholders</i>	Marginalised people, Designers and users
<i>Participation measures</i>	Inclusivity or exclusivity of the process of participation shapes
<i>Participation degrees</i>	Include all, Effective participation, Meaningful involvement, Equitable participation, Real participation

**Camara et al. 2008**

<i>Participation theme:</i>	Socio-Technical ICT Design for the Developing World
<i>Related constructs:</i>	PD
<i>Construct definition:</i>	The objective of PD is to promote the transfer and exchange of knowledge.
<i>Actors/Stakeholders</i>	Users, designers, partners
<i>Participation measures</i>	Respecting opinions; free views exchange and arguments of supreme power prevail; respect of meetings proceedings
<i>Participation degrees</i>	Actual participation, Participation of all

**Chango, 2007**

<i>Participation theme:</i>	Design of e-Government systems
<i>Related constructs:</i>	Design-Reality Gap
<i>Construct definition:</i>	The 'design-reality gap' analysis shows that on several dimensions, the underlying perceptions and thus the assumptions built into the systems are different, if not conflicting, with the reality in the targeted setting.

*Actors/Stakeholders* International and regional organisations, Nations, Nationals

*Participation measures:* Open and not unquestioned design

*Participation degrees* Active participation and consent, Closed and unquestioned design,

#### **Chawner, 2012**

*Participation theme:* FLOSS design, coordination and development processes and practices

*Related constructs:* Openness, closures

*Construct definition:* Openness entails the freedom and the rights of distributed community of developers and users to jointly access, use, modify and redistribute source code for all software they use.

*Actors/Stakeholders* Distributed community of developers and users, Participants

*Participation measures* Freedom to use, study, modify and redistribute; Product openness and process openness

*Participation degrees* Active participation; open, transparent and closed process

#### **Chetty et al. 2004**

*Participation theme:* Developing locally relevant software applications for rural areas

*Related constructs:* User centred design and participation

*Construct definition:* The participatory aspect is the involvement of the target community members in the software development life cycle.

*Actors/Stakeholders* Community members in a village, Developers, Researchers

*Participation measures* Show and Tell Approach

*Participation degrees* Target community members

#### **Chilundo and Sahay, 2005**

*Participation theme:* Construction and use of the representations

*Related constructs:* Representation

*Construct definition:* Representations are artefacts that refer to other objects or events that extract what are considered the most relevant characteristics of these objects or events

*Actors/Stakeholders* Citizens, international agencies and national health authorities

*Participation measures* Effective representation of the reality on the ground, Health indicators, making knowledge and work practices visible

*Participation degrees* Mediation of workers and managers alike; visible and invisible representation, conflicting and incorrect representations

#### **Cogburn, 2004**

*Participation theme:* Exploring the current structure of transnational advocacy networks in the ICT policy arena

*Related constructs:* Civil society participation

<i>Construct definition:</i>	Civil society collaborate with other institutions and organisations in presenting, framing, refining, debating and eventually recommending issue as specific policy options
<i>Actors/Stakeholders</i>	Civil Society, Organisations; Heads of State, CEOs, World citizens
<i>Participation measures</i>	Readiness to collaborate; high levels of cognitive and affective trust; Consensus building and intense contestation;
<i>Participation degrees</i>	Active but limited influence; active participation; less visible; highly exclusionary and elite decision-making processes

**Davis and Jabeen, 2011**

<i>Participation theme:</i>	FLOSS design, coordination and development processes and practices
<i>Related constructs:</i>	Participation
<i>Construct definition:</i>	Participation entails sharing of knowledge, collaboration and co-creation of knowledge and community conducive to learn and hone from experts.
<i>Actors/Stakeholders</i>	Participatory learning community: technologists, educators, administrators, users and developers
<i>Participation measures:</i>	Rights to modify or copy code stay exclusively with software developers and publishers; legitimacy, peripherality and participation
<i>Participation degrees</i>	Legitimate peripheral participation, full participation, exclusivity of certain rights, active participation, free availability to all,

**de Jager et al. 2012**

<i>Participation theme:</i>	Discovering innovative collaborative knowledge
<i>Related constructs:</i>	Collaborative innovation, knowledge discovery
<i>Construct definition:</i>	The knowledge discovery process, and other collaborative knowledge activities, generates vast quantities of knowledge within the internal and external domains.
<i>Actors/Stakeholders</i>	Academic, support and administrative staff
<i>Participation measures</i>	Social networking space for profiling and registering; establishing all services the community needs,
<i>Participation degrees</i>	Full cooperation, full participation

**de Vreede and Mgaya, 2006**

<i>Participation theme:</i>	Exploring design and applicability of Collaborative learning processes
<i>Related constructs:</i>	Collaborative Learning
<i>Construct definition:</i>	Collaborative learning emphasises group or cooperative efforts among students and faculty, and often focuses on the interaction between students themselves.
<i>Actors/Stakeholders</i>	Students, higher education institutions, teaching staff
<i>Participation measures</i>	Discuss topics freely, any-time any-place collaboration, Anonymity, parallel input, and group memory,

*Participation degrees* Meaningful interactions, discuss freely, actively discuss and debate, more participation, free expression, equal distribution,

#### **de Vreede et al. 2003**

*Participation theme:* Exploring design and applicability of groupware technology

*Related constructs:* Collaboration

*Construct definition:* Collaboration implies that participants are engaged for focus and structure group deliberation, while reducing cognitive costs of communication and information access among teams working together towards a goal.

*Actors/Stakeholders* Top management, tutors, students, councillors, unemployed youths, heads of departments, secretaries

*Participation measures* Open and non-conservative behaviour, anonymity, group memory, productivity, democratic, equal, open, focused

*Participation degrees* Higher levels of decision making and perceived participation equity, higher level/less change in consensus,

#### **Dearden, 2008**

*Participation theme:* Examining interaction design contribution to IT for development

*Related constructs:* HCI or Interactive Design

*Construct definition:* HCI or Interaction design concerns the ways in which humans work with and through ICT systems and how ICT systems can be designed to ensure effective and satisfying interactions.

*Actors/Stakeholders* Interaction designers and development practitioners, researchers and practitioners, users, field practitioners and students

*Participation measures* Networks of practitioners and academics, conduct follow-ups members unwilling to participate or do not trust the new arrivals,

*Participation degrees* Actively involvement, truly open design debate

#### **Denison and Stillman, 2012**

*Participation theme:* Identifying and Exploring academic and ethical challenges of PCR

*Related constructs:* Participation

*Construct definition:* With community engagement, PCR insists upon a process and outcome which lead to mutual understanding and articulation of values.

*Actors/Stakeholders* Academic researchers, community members,

*Participation measures* Acknowledgement of communities as equal partners, Mutual trust and respect; Agreement, pluralism and democratic decision making

*Participation degrees* Equal partnership, ignored, sidelined, marginally acknowledged, less engaged, Continuum of relationships that range between consensus and conflict

**Dlodlo et al. 2008**

<i>Participation theme:</i>	Design and development of digital platform to support service delivery
<i>Related constructs:</i>	Participation
<i>Construct definition:</i>	LL environment, a user-centric approach, ensures participation by allowing an interaction or co-creative approach between the user and the researcher over the whole development process.
<i>Actors/Stakeholders</i>	Vulnerable children, Government, Researcher and Technologist
<i>Participation measures</i>	Effective empowerment of children, accessible via multiple media elements, self-supporting structures, integrated friendly environment
<i>Participation degrees</i>	Early involvement of the users in actual innovation processes, Open innovation

**Dralega et al. 2010**

<i>Participation theme:</i>	Theory formation, design and implementation of ICT services for citizens
<i>Related constructs:</i>	Participation, Engagement
<i>Construct definition:</i>	Participation and engagement implies encompassing all multiplicities of societies with different and similar perceptions of what information and knowledge are, for whom and why
<i>Actors/Stakeholders</i>	Citizens, youths, farmers, women, municipalities, management, politicians
<i>Participation measures</i>	Democratisation, democratic inclusion, disengaged, increasingly politically engaged, Transparent, accountable, and effective
<i>Participation degrees</i>	Democratic and distributive justice, increased democracy, equally free to pursue life, enhanced democracy, political apathy and non-participation,

**Elovaara et al. 2006**

<i>Participation theme:</i>	Mutual learning of local and situated interpretations and implementations of participation in PD projects
<i>Related constructs:</i>	PD
<i>Construct definition:</i>	The central issue of PD has been the user involvement in computer based systems design.
<i>Actors/Stakeholders</i>	Designers and users, researchers
<i>Participation measures</i>	Build consensus, recapture PD's political dimensions, fixed and fluid, trust, openness and to give room for participation
<i>Participation degrees</i>	Formal representative democracy, some user group dominate over the other in PD projects

**Ferguson et al. 2013**

<i>Participation theme:</i>	Reflecting and engaging with peers (blogging) to build ICT4D discourse
<i>Related constructs:</i>	Participation: blogging
<i>Construct definition:</i>	Bloggging makes it possible for anyone involved in ICT4D and with internet access to express ideas and experiences with others interested in these issues, irrespective of geographical boundaries.
<i>Actors/Stakeholders</i>	Bloggers and their audiences, practitioners, peers, bloggers, program managers or advisors
<i>Participation measures</i>	Perceived and actual levels of interactions, democratise development and promotes participation, open and interactive nature,
<i>Participation degrees</i>	Wider participation, small community of peers rather than a larger audience, larger participation, enhance participation

**Ford and Gelderblom, 2003**

<i>Participation theme:</i>	Design of user interfaces
<i>Related constructs:</i>	User centred design
<i>Construct definition:</i>	Designing an interface that is fully consistent to the user, the designer needs to accommodate cultural dimensions as well as the user profile variables into the design of the user interface.
<i>Actors/Stakeholders</i>	Users, designers
<i>Participation measures</i>	Performance, Usability and consistency
<i>Participation degrees</i>	Dominate the user's interaction

**Foth et al. 2006**

<i>Participation theme:</i>	Design of technology to facilitate social communication and interaction
<i>Related constructs:</i>	Social communication and interaction
<i>Construct definition:</i>	Social communication and interaction concern informing the designing of the product development and the environment in which products will be utilised.
<i>Actors/Stakeholders</i>	Urban residents, users, designers
<i>Participation measures</i>	Social inclusion, fair access, ICT for all, communicative ecology: 'online and offline', 'global and local' and 'collective and networked'
<i>Participation degrees</i>	Greater social inclusion, meaningful engagement, gated community, open community, social isolation and 'non-connectedness'

**Godjo, 2010**

<i>Participation theme:</i>	Design of IT systems
<i>Related constructs:</i>	Participation and interaction

*Construct definition:* User participation and interaction enables designers to present their solutions and users to assess these realistic situations in use.

*Actors/Stakeholders* Designers and users

*Participation measures* Mediating interactions

*Participation degrees* User involved in design process (need analysis), via questionnaires, and in prototyping of the equipment made available to them.

### Harvey, 2011

*Participation theme:* Negotiating openness across science, ICTs and Participatory Development

*Related constructs:* Participation, openness

*Construct definition:* Participation and Openness implies users or consumers assume multiple roles as they view, respond to, amend, and share content among different communities of interest or practice.

*Actors/Stakeholders* Designers, end-users, consumers

*Participation measures* Multiplicity, Openness

*Participation degrees* Active participation and producing, rarely transparent or openly reflected on, limiting of participation and openness

### Hellstrom and Karefelt, 2012

*Participation theme:* Crowdsourcing and participation using mobile phones

*Related constructs:* Crowdsourcing, participation

*Construct definition:* Crowdsourcing involves outsourcing a specific task to a large group of people; enables distributed interaction (many-to-many interaction between users and ICT distributed across geographical space and in time)

*Actors/Stakeholders* Citizens, civil society and the state, partners

*Participation measures* Accountability, Good governance, Transparency

*Participation degrees* Political equality, elite-directed forms of participation, good governance, open and bounded crowdsourcing,

### Heukelman and Obono, 2008

*Participation theme:* Design user interface of the African Village Metaphor

*Related constructs:* Design, Interaction

*Construct definition:* Design refers to the ability of practitioners to be aware and recognise, navigate, interact and perceive cultural aspects and social artefacts such as metaphors and icons into the system design.

*Actors/Stakeholders* Designers, Local culture participants, Environment

*Participation measures* Cultural and age group orientation – metaphor depended on culture and age group

*Participation degrees* Effective participation

**Jokonya and Hardman, 2011**

<i>Participation theme:</i>	Contribution of Stakeholder collaboration during open source software migration
<i>Related constructs:</i>	Collaboration
<i>Construct definition:</i>	Collaboration entails interaction, involvement and engagement among stakeholders across competences, interests, responsibilities and perhaps professional languages to generate, communicate, and share ideas and to negotiate roles and interests.
<i>Actors/Stakeholders</i>	Internal and external stakeholders, Management, IT Staff, End-users
<i>Participation measures</i>	Free access and modifying of source code, holistic approach in considering internal and external stakeholders
<i>Participation degrees</i>	Open (free) and closed (proprietary) software, wider consultation of stakeholders

**Kendall et al. 2006**

<i>Participation theme:</i>	Formulating information and communication technology (ICT) policy through discourse
<i>Related constructs:</i>	Partnerships, collaboration
<i>Construct definition:</i>	Partnerships and collaboration entails communication and sharing of information, ideas and best practices among key stakeholders in policy formulation process to strengthen the impact and quality of policy and its implementation.
<i>Actors/Stakeholders</i>	Government officials, academics, consultants, employees of non-government organisations, donors, and development officers,
<i>Participation measures</i>	Open forum Internet discussion groups, Unrestricted market access, Fair and unbiased, Hope and optimism
<i>Participation degrees</i>	Critical interaction, open discussion forum, oppose democracy, active participation, Neglect to reflect on the discourse, Fluid interaction

**Kimaro and Sahay, 2007**

<i>Participation theme:</i>	Incorporating local use, ideas and knowledge of information in decision making and planning
<i>Related constructs:</i>	Decentralisation
<i>Construct definition:</i>	Decentralisation includes participation of stakeholders in the development and use of the systems and the integration of various reporting systems that are operating at the local level.
<i>Actors/Stakeholders</i>	Planners and implementers, district and sub-district individuals, vertical program coordinators, and political administrative system
<i>Participation measures</i>	Equity and accessibility, removing layers of bureaucracy, legitimacy,



*Participation degrees* Top-down design of decentralisation, limited participation, minimal involvement, inadequate collaboration, poor collaboration

#### **Kimaro and Titlestad, 2008**

*Participation theme:* Applying participatory approaches during system development in least developed countries

*Related constructs:* Participatory customisation

*Construct definition:* User participation implies involvement of the users in customisation processes of a system development. Customisation means that the intended users change the system design in order to reflect their work practices and needs

*Actors/Stakeholders* Researchers, partner agency, developers, users, community organisation

*Participation measures* Building common understandings, motivation and effective participation, democratic and empowered environment

*Participation degrees* Joint collaboration, participation not really participation, Not participating, partial or unpredictable participation

#### **Krauss, 2012**

*Participation theme:* Self-reflexivity and self-critique in developing, and critiquing ICT4D initiatives

*Related constructs:* Building networks of friendships

*Construct definition:* Building networks of friendships means community engagement so as to understand meaning from within the lifeworld and realities of the local people and to build partnerships so as to introduce and critique ICT4D.

*Actors/Stakeholders* People in need of development (the developing) and outsider 'doing' the development or researching the development (the developed).

*Participation measures* Building partnerships, appropriate ways of community engagement, social harmony and conformity, false consciousness

*Participation degrees* False consciousness, appropriate engagement

#### **Korpela et al. 1998**

*Participation theme:* Partnership in Information Systems design and development

*Related constructs:* Community Participation

*Construct definition:* Community participation entails involving of the communities in the implementation of programs and giving feedback on all data in their community.

*Actors/Stakeholders* Designers, users, providers, community representatives,

*Participation measures* Creating an authoritarian political climate, produce apathy, a sense of insecurity about life, and increased poverty

*Participation degrees* Full participation; actively involve the communities at all levels, genuine involvement

#### **Leinonen et al. 2008**

*Participation theme:* Hypothesising software

*Related constructs:* Design

*Construct definition:* Design is thinking and communicating process. Design is planning and patterning of any act toward a desired, foreseeable end constitutes the design process. Thus, design implies 'integration of reason with observation, reflection, imagination, action and production'.

*Actors/Stakeholders* Design practitioners, Users

*Participation measures* Wikis : "a type of website that allows users to easily add, remove, or otherwise edit all content, very quickly and easily, sometimes without the need for registration", Community-run and independent IS

*Participation degrees* Active in shaping the social conditions they live in, Open communication

#### **Lewis, 2005**

*Participation theme:* Negotiating the Internet

*Related constructs:* Negotiation

*Construct definition:* Negotiation towards social construction means attempt to understand the conflicting sets of interest at play and the dynamic of their development and resolution.

*Actors/Stakeholders* Interest groups, social actors, private sector ISPs,

*Participation measures* Downplay the role of society and social forces, overlook contestation require clearance for 'official' viewpoints, high degree of relevance, high degree of contestation,

*Participation degrees* Centrally involved, role player, reluctance of staff to talk on record, unsystematic negotiation, inability to exert meaningful influence

#### **Loudon and Rivett, 2011**

*Participation theme:* Enacting openness in ICT4D research

*Construct definition:* Openness is interpreted here as an active process of engagement, knowledge sharing, and co-creation, might guide ICT4D research.

*Actors/Stakeholders* ICT4D researchers, users

*Participation measures* Universal over-restricted access to communication tools and information, universal over-restricted participation

*Participation degrees* Active engagement, monolithic and exclusionary, equitable and effective participation, widening participation

#### **Luk et al. 2008**

<i>Participation theme:</i>	Design of a prototype remote consultation system
<i>Related constructs:</i>	Interaction Design
<i>Construct definition:</i>	Design entails informing and influencing the design of system, interaction design implies participants are able to consult, discuss and give responses on a self-organising system that also reflects the realities of connectivity and access on the ground.
<i>Actors/Stakeholders</i>	Doctors in developing countries, western specialists, designers, users, ranging from medical interns to senior administrators
<i>Participation measures</i>	Creating stable environments
<i>Participation degrees</i>	Free-form discussion, Full-featured, open-ended interaction, Active participation, Initial participation and continuous growth

**Luo et al. 2010**

<i>Participation theme:</i>	Building a productive, scalable and sustainable collaboration model for OER
<i>Related constructs:</i>	Collaboration, Openness
<i>Construct definition:</i>	Open resources are 'digitized materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research'.
<i>Actors/Stakeholders</i>	Learners, instructors, contributors, educators, designers, researchers, subject experts
<i>Participation measures</i>	Distributed collaboration, freely and openly, common ground, collaboration readiness, technology readiness
<i>Participation degrees</i>	Distributed collaboration, Early collaboration, Free and Open, Exclusionary collaborative contributions, Increased collaboration,

**Lwoga et al. 2010**

<i>Participation theme:</i>	Management of agricultural IK in developing countries
<i>Related constructs:</i>	Knowledge management
<i>Construct definition:</i>	Knowledge management encompass inter alia, creation, sharing, and innovative ways of preserving, and sustaining both tacit and explicit knowledge (indigenous knowledge) within and across community organisations and generations
<i>Actors/Stakeholders</i>	Elders, community members, management, smallholder farmers, community leaders, local extension officers
<i>Participation measures</i>	Knowledge-creating setting that continuously creates, distributes and shares knowledge within and beyond the communities' boundaries
<i>Participation degrees</i>	Effective management and use of knowledge, closed/open systems or formal/informal organisations, effective knowledge creation

**Mainsah and Morrison, 2012**

<i>Participation theme:</i>	Designing for participative cultural expression via social media
<i>Related constructs:</i>	Design, civic engagement
<i>Construct definition:</i>	Designing for participation means designing for access, designing for reconfiguration, and designing for remediation. Civic engagement entails involvement in negotiating the interests and perspectives of different stakeholders in civic initiatives.
<i>Actors/Stakeholders</i>	Partners, designers, educators and researchers, youths
<i>Participation measures</i>	Co-design aims to enable participative and democratic engagement as cultural production and dialogue, Prior and ongoing negotiations
<i>Participation degrees</i>	Participative and democratic engagement, open access, transparent mediated participation, more active and critical involvement

**Marsden, 2008**

<i>Participation theme:</i>	Empowering the user to design
<i>Related constructs:</i>	Empowered design
<i>Construct definition:</i>	Empowered design means that in building any system, users are empowered to modify it to fit their own needs
<i>Actors/Stakeholders</i>	End users, designers, developers, researchers
<i>Participation measures</i>	Ability to customize open source packages and shape them into a viable solution.
<i>Participation degrees</i>	Prevalent and free interaction

**Marsden et al. 2008**

<i>Participation theme:</i>	HCI design beyond traditional foci of work and civic settings
<i>Related constructs:</i>	Interactions and Design
<i>Construct definition:</i>	Interactions and design refers to interactions between user, technology and the designer where the user input ideas, influence and inform processes and activities on creating technologies that are appropriate to people living in ICT-sparse contexts.
<i>Actors/Stakeholders</i>	Users, designers,
<i>Participation measures</i>	Creation of appropriate technologies, models of linear structure, human access point, community's use rather than an individual's use
<i>Participation degrees</i>	Co-designing from initial concept, share ideas and create prototypes jointly, design process is still disassociated from the end-users,

**Masita-Mwangi et al. 2011**

<i>Participation theme:</i>	Designing an e-solution for Linking Informal Self-Help
<i>Related constructs:</i>	Design
<i>Construct definition:</i>	Design entails incorporating end-users in sharing and exchanging ideas in developing and structuring a virtual platform. Interaction

activities of the end-users include testing and giving feedback on the system in use.

*Actors/Stakeholders* Researchers and users, group members

*Participation measures* Flexible and effective, Elimination of language barriers

*Participation degrees* Minimal interactions, Interact successfully, Trusteeship, More group interaction and linkages, Increase transparency and participation

### **Maunder et al. 2007**

*Participation theme:* Designing Interactive Systems

*Related constructs:* Design

*Construct definition:* 'User-centred' design approach focuses on the target users from the beginning of the design process, continually checking the design with the users to ensure that they are in fact comfortable with it.

*Actors/Stakeholders* Rural community, trackers, researchers, designers, developers

*Participation measures* Appropriateness of existing UCD methodologies, preventing true PD from being realised

*Participation degrees* Active user participation, progressive participation, true PD

### **Mengesha, 2010**

*Participation theme:* Developing the technological capacity of indigenous groups through OSS implementation

*Related constructs:* Learning and sharing

*Construct definition:* Learning and sharing , network and/or community of actors align interests,

*Actors/Stakeholders* Developers, contributors, users, project manager, cataloguers

*Participation measures* Disclosure and dissemination of source code, robust and sustainable, lengthy and hectic bureaucratic processes, negotiations

*Participation degrees* 'Anyone' ... could use, modify and distribute any OSS written by 'anyone', Participation ... from the periphery to the centre,

### **Merritt and Stolterman, 2012**

*Participation theme:* PD Research

*Related constructs:* PD

*Construct definition:* PD is about design and the close collaboration between key stakeholders. Participation, as a type of interaction, entails negotiations in situ.

*Actors/Stakeholders* PD community—researchers, decision makers, system designers, users

*Participation measures* Refined approaches to improve participation, varied levels of participation and non-participatory method decisions,

*Participation degrees* Lively ideological public discourse, Designers dominate, Open to 'being participated', increased participation

**Misuraca, 2006**

<i>Participation theme:</i>	Theory to action: e-Governance in Africa
<i>Related constructs:</i>	Governance
<i>Construct definition:</i>	Governance entails decentralisation and local-control of decisions; community participation in improving the performance and administration of service delivery at all levels.
<i>Actors/Stakeholders</i>	Government, citizens, public
<i>Participation measures</i>	Democratic governance and enabling environment, participation and efficiency are required of all the partners linked in a network
<i>Participation degrees</i>	Good governance, improving the performance of governance systems at all levels, open discussion and participation

**Morrison et al. 2012**

<i>Participation theme:</i>	Evaluating mass participation systems
<i>Related constructs:</i>	Mass participation
<i>Construct definition:</i>	Mass participation entails progress from the lab, controlled environment towards reaching potentially very large numbers of users (participants) to appropriate technology in contexts more representative of the technologies' eventual intended use and settings.
<i>Actors/Stakeholders</i>	Locals, online participants
<i>Participation measures</i>	Local trial, mass participation, very controlled conditions, uncontrolled environments,
<i>Participation degrees</i>	Local trial, mass participation, more controlled laboratory conditions; more closely align with the systems' context, more representative

**Mosemghvdlishvili and Jansz, 2012**

<i>Participation theme:</i>	Negotiability of technology
<i>Related constructs:</i>	Negotiation and participation
<i>Construct definition:</i>	Negotiability expresses the notion that all technology entails different development paths that are negotiated within relevant groups involved in the complex process of technology development.
<i>Actors/Stakeholders</i>	Expert users, independent developers
<i>Participation measures</i>	Independent developers, unable to create apps, generative (open) device, creative environment, freedom, open and collaborative
<i>Participation degrees:</i>	Increasing user participation, restricted writing of apps, consumers prohibited, independent developers allowed to create and distribute

**Mosse and Byrne, 2005**

<i>Participation theme:</i>	Collective Identity in HIS Development
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<i>Related constructs:</i>	Collective identity formation
<i>Construct definition:</i>	Identity enables people to exercise their understanding of these rules in a particular social system. Identity is recursively and discursively created and recreated through human actions and interactions defined within a social
<i>Actors/Stakeholders</i>	Social actors, group of individuals, managers and doctors
<i>Participation measures</i>	Power Increase/decrease, imposition, arena to share meaning and understanding,
<i>Participation degrees</i>	Control and restrict, to form and to transform, continuous Interaction, without consultation with authorities at the local level

#### **Msibi and Penzhorn, 2010**

<i>Participation theme:</i>	Active involvement of people in all stages of development projects
<i>Related constructs:</i>	Participatory communication
<i>Construct definition:</i>	Participatory communication focuses on the active involvement of the people in all stages of development projects, is crucial for sustainable development.
<i>Actors/Stakeholders</i>	Government officials, community members, developers, community development workers
<i>Participation measures</i>	Follows accepted participatory communication principles and practices, accountable, transparent, responsive government
<i>Participation degrees</i>	Active involvement, active participation, true participatory communication, genuine dialogue, authoritarian style of governance

#### **Mthoko and Pade-Khene, 2012**

<i>Participation theme:</i>	Developing theoretical framework for ethical practice in ICT4D
<i>Related constructs:</i>	Collaboration and participation
<i>Construct definition:</i>	Collaboration and participation is whereby the people who are being researched are involved in the entire process of the research.
<i>Actors/Stakeholders</i>	Rural communities, researchers, practitioners, environment of real partnerships
<i>Participation measures</i>	Exclusion and inequity, gaining goodwill of the community, protection from legal action and avoiding unfavourable publicity,
<i>Participation degrees</i>	Increased inequity and exclusion, real partnerships, free of interference, reinforce existing monopolies, engaging all stakeholders

#### **Muhren et al. 2008**

<i>Participation theme:</i>	Proposing IS Design premises for information processing and decision-making behaviour of organisations
<i>Related constructs:</i>	Collaboration, communication

<i>Construct definition:</i>	Collaboration and communication entails information or cue sensing and gathering, processing, sharing and dissemination in order to get prepared and manage ongoing and abrupt crisis situations.
<i>Actors/Stakeholders</i>	Humanitarian aid and development organisations, communities, citizens
<i>Participation measures</i>	Two-way communication, cooperation extending beyond mere exchange of information,
<i>Participation degrees</i>	Good practices and best communication and collaboration, mere exchange of information, free exchange of information

**Muniafu et al. 2005**

<i>Participation theme:</i>	Creating a support environment for the development of ICT projects in rural areas
<i>Related constructs:</i>	Collaboration (support environment)
<i>Construct definition:</i>	In support environment, collaboration entails getting involved and be able to support in the development of an ICT-enabled project. Support environment brings together stakeholders in the services development and assist to visualise future scenarios
<i>Actors/Stakeholders</i>	Developers, citizens, community based organisations, and small, medium and micro enterprises
<i>Participation measures:</i>	Supportive environment, ineffectual and unsustainable design, work proactively, rehearse and evaluate scenarios before implementing
<i>Participation degrees</i>	Effective cooperation, decentralisation, supplier/customer interaction

**Mursu et al. 2000**

<i>Participation theme:</i>	ISD in a Developing Country
<i>Related constructs:</i>	Collaboration, communication
<i>Construct definition:</i>	(same as in <b>Muhren et al. 2008</b> )
<i>Actors/Stakeholders</i>	Humanitarian aid and development organisations, Communities, Citizens
<i>Participation measures</i>	(same as in <b>Muhren et al. 2008</b> )
<i>Participation degrees</i>	Good practices and best communication and collaboration, two-way communication, free exchange of information

**Ochara, 2008**

<i>Participation theme:</i>	Analysing emerging e-Government artefact
<i>Related constructs:</i>	Inclusion/exclusion
<i>Construct definition:</i>	Social exclusion means that an individual is socially excluded if he or she is geographically resident in a society and does not participate in the normal activities of citizens in that society.
<i>Actors/Stakeholders</i>	Government, citizens, public, international, national, and local players



*Participation measures* Socially inclusive, Enabling environment, Complex political and institutional environments, Good governance, Voluntary associations,  
*Participation degrees* Thinly veiled control, Increased and better access, Access by all Kenyans, Governance was 'forced' Enhanced democracy,

### **Ojo, 2006**

*Participation theme:* Revolutionising human interactions and communication by ICTs

*Related constructs:* Community participation

*Construct definition:* Community participation entails being able to access, gather, communication, dissemination, or share information and knowledge, collectively play active roles

*Actors/Stakeholders* Health professionals, researchers, patients, NGOs

*Participation measures* Pluralism, re-skilling of lay people, political will and technical expertise

*Participation degrees* Effective information dissemination, effective communication, information rich/poor, active participation

### **Pade-Khene et al. 2010**

*Participation theme:* Co-creating innovative solutions through LL framework

*Related constructs:* Collaboration

*Construct definition:* Collaboration means stakeholders partner to co-create innovative solutions for development. Collaboration widens and adds to the vision of the LL, and essentially support new and existing rural development programmes.

*Actors/Stakeholders* Public, private and civic: academia, industry, government, communities

*Participation measures* Playing a key role in shaping the activities and functions, Develop and implement the project appropriately, awareness of livelihoods

*Participation degrees* Open participative debate, open democratic debate, informing all stakeholders, true participation

### **Pfeffer et al. 2013**

*Participation theme:* Knowledge integration through participatory spatial knowledge production and exchange platform

*Related constructs:* Participation

*Construct definition:* Participation involves bringing together those types of knowledge which are usually not laid down in written form – tacit, community-based and sectoral knowledge related to practice – as well as to include actors that are usually excluded.

*Actors/Stakeholders* Professionals and practitioners, community members, state, ngos, business, consultants, scientists and civil society

*Participation measures* Data reliability of user-generated content, social exclusion  
*Participation degrees* Greater inclusion, empowerment and accountability, more inclusive, all stakeholders can contribute in urban governance,

#### **Puri et al. 2004**

*Participation theme:* The design and implementation of community-based ISs  
*Related constructs:* Participation  
*Construct definition:* Participation aspires to draw upon users' knowledge of work processes into ISD to improve the end product, and also to foster democracy and full involvement of other stakeholders in systems design.  
*Actors/Stakeholders* Health professionals researchers, patients, NGOs, community members  
*Participation measures* Design, implementation and sustainability with a focus on the local level; increased sensitivity to the social context of IS design; Capacity development  
*Participation degrees* Full involvement

#### **Ramachandran et al. 2007**

*Participation theme:* Designing and introducing ICT solutions in developing countries  
*Related constructs:* Co-design  
*Construct definition:* Co-design entails engaging local stakeholders by designers in activities and processes of a system design, development and implementation.  
*Actors/Stakeholders* Designers, community members  
*Participation measures* Providing opportunities to interact with technology artefact, Neglect the poor, designing appropriate technology  
*Participation degrees* Meaningful feedback and participation, active engagement

#### **Rodil et al. 2012**

*Participation theme:* Continuous renegotiations in a system design  
*Related constructs:* Participation  
*Construct definition:* Participation means involving community members to determine and/or influence the research and design agenda  
*Actors/Stakeholders* Designers, developers, community members, the environment  
*Participation measures* Consciousness of interconnectedness of all, Holistic approach  
*Participation degrees* Continuous interactions, increased participation, facilitated co-creation, truly PD, active collaboration

#### **Schmidt, 2004**

*Participation theme:* Participation and representation in WSIS  
*Related constructs:* Participation, representation

<i>Construct definition:</i>	Being able to represent and participate in deliberations on policy issues and topics concerning various stakeholders
<i>Actors/Stakeholders</i>	Civil society – community centres, public radio stations, parent-teacher associations, churches, labour unions,
<i>Participation measures</i>	Lacked coordination and failed to build consensus, 'understood the ground level', failure to coordinate, voice of their own
<i>Participation degrees</i>	Effective participation, lacked coordination, direct interactions, active involvement, participation was impossible, include 'all voices'

**Smith and Elder, 2010**

<i>Participation theme:</i>	Open development
<i>Related constructs:</i>	Openness
<i>Construct definition:</i>	Democracy and participation represent an opening-up of decision-making processes to more people – transparency and accountability
<i>Actors/Stakeholders</i>	Civil society, developers, researchers
<i>Participation measures</i>	New and transformative applications and services; means to communicate and produce content, decentralised innovation models, universal over restricted
<i>Participation degrees</i>	Less to more open

**Thinyane et al. 2007**

<i>Participation theme:</i>	Designing ontology-based model of IK systems
<i>Related constructs:</i>	Participation, inclusion
<i>Construct definition:</i>	Participation and inclusion entails the incorporation of social actors in taking part in knowledge production, usage, preservation and dissemination
<i>Actors/Stakeholders</i>	Communities, economy
<i>Participation measures</i>	Little control over the content, access/access not, have/have not, knows/knows not, sidelining and marginalisation
<i>Participation degrees</i>	Greater social participation and awareness, democratic and egalitarian participation, mass participation, little control,

**Thompson and Walsham, 2010**

<i>Participation theme:</i>	Strategising ICT Research in Africa
<i>Related constructs:</i>	Engagement
<i>Construct definition:</i>	Engagement implies locking in strategic, policy-level debate about the transformative potential of ICT within developmental agendas.
<i>Actors/Stakeholders</i>	'African developmental ICT' research community, other research disciplines community, literature, researchers and practitioners
<i>Participation measures:</i>	Extremely contested concept, willingness to engage openly, inequalities, political instability, and ecological fragility

*Participation degrees* Explicit engagement, explicit acknowledgement and discussion, more strategic engagement, little or no engagement/critique

#### **Uwadia et al. 2006**

*Participation theme:* Collaborative ISD

*Related constructs:* Collaboration

*Construct definition:* Collaboration is the involvement of several people from the various institutions working together on the development of an MIS project for the benefit all the participants.

*Actors/Stakeholders* Universities, council of university, teachers, students, administrators, staff, external consultants and donors

*Participation measures* Lack of funds, the lack of commitment, and the lack of infrastructure, Degree of concordance

*Participation degrees:* Not to cooperate, Joint development, equally diverse membership

#### **Vande Kar et al. 2006**

*Participation theme:* Designing in unstable environments

*Related constructs:* Design

*Construct definition:* Design refers to defining and elaborating properties of a specific solution – computer driven solution.

*Actors/Stakeholders* Designers, community organisations, users, developers, (ordinary citizens, community based organisations

*Participation measures* Unfamiliar, noisy, or traffic-jammed environment

*Participation degrees* Effective design, appropriate design patterns

#### **VanRensburg et al. 2008**

*Participation theme:* Establishing a network of ICT-enabled, sustainable 'community of enterprises'

*Related constructs:* Participation

*Construct definition:* Participation in this ongoing learning refers to inviting comments on certain issues and sharing ideas and knowledge on experiences and lessons learned.

*Actors/Stakeholders* Development and implementation practitioners, Community organisations, Members, Developers and researchers

*Participation measures* More socially responsible approach, coordinated approach to ownership, ownership, benefit and sustainability,

*Participation degrees* Quick and reliable 'feedback', open and collaborative innovation

#### **Waema and Mitullah, 2007**

*Participation theme:* Good governance in system implementation

*Related constructs:* Governance

<i>Construct definition:</i>	Governance entails involving or engaging lower level organisations, institutions and/or stakeholders in various activities and the decision-making process.
<i>Actors/Stakeholders</i>	Government and local authority institutions
<i>Participation measures</i>	Good governance (participatory, transparent, accountable, effective, and equitable), Become proactive in governance
<i>Participation degrees</i>	Good governance, more democratic participation, improved interactions, increased inclusiveness, lack of meaningful participation,

**Watson and McCubbrey, 2009**

<i>Participation theme:</i>	Developing and disseminating open content electronic texts
<i>Related constructs:</i>	Openness
<i>Construct definition:</i>	Openness entails engaging a community in the open production and sharing of intellectual works
<i>Actors/Stakeholders</i>	Teachers, Professors, Students
<i>Participation measures</i>	Collaborative creation of content, willingly collaborate to create content and software that are freely available to all
<i>Participation degrees</i>	Free and Open, Willingly collaborate, freely available to all, Open Collaboration

**Winschiers, 2006**

<i>Participation theme:</i>	Designing for Usability
<i>Related constructs:</i>	PD
<i>Construct definition:</i>	PD is about design and the close collaboration between key stakeholders. Participation, as a type of interaction, entails negotiations in situ.
<i>Actors/Stakeholders</i>	Researchers and practitioners, Developers
<i>Participation measures</i>	Guarantees frequent communication, oppressive colonial system, with an authoritarian and hierarchical social order
<i>Participation degrees</i>	Limited input, inadequate client participation, lack of communication, unwittingly overwrite design decisions

**Winschiers-Theophilus, 2009**

<i>Participation theme:</i>	Designing usable IT across cultures
<i>Related constructs:</i>	Design
<i>Construct definition:</i>	Design refers to taking part in implanting values and infusing reality into a system
<i>Actors/Stakeholders</i>	Designer, Users, Practitioners, Researchers, Creators
<i>Participation measures</i>	IT creators model IT solutions according to their cultural background, Lack of appropriate integration
<i>Participation degrees</i>	Appropriate Design

**Winschiers-Theophilus et al. 2010**

- Participation theme:* Designing and implementing ICTs for socio-economic development
- Related constructs:* Participation, interaction
- Construct definition:* Participation refers to involving of local people in co-designing a knowledge system.
- Actors/Stakeholders* Indigenous people, designers and developers, facilitators
- Participation measures* Not expected, though not formally prohibited, to publicly and openly express opinions
- Participation degrees:* To publicly and openly express opinions

**Winschiers-Theophilus et al. 2012**

- Participation theme:* Exploring underlying PD assumptions and expectations
- Related constructs:* Participation, interaction
- Construct definition:* True participation ensures that the local people are adequately represented in the processes and activities – interactions and reflections – of the information system development.
- Actors/Stakeholders* Designer, users, practitioners, researchers, creators
- Participation measures* Deeper awareness of the differences in knowledge systems, , Account for diversity, connectedness of all
- Participation degrees:* True participation, adequate representation, adequate representation, Local participation, actively facilitating participation

**Wyche et al. 2010**

- Participation theme:* Formulating an alternative design vision (Designing for deliberate interactions)
- Related constructs:* Interactions
- Construct definition:* Interactions, specifically deliberate interactions are a form of interactions with ICTs that are planned, purposeful and involves offline preparation.
- Actors/Stakeholders* Researchers, designers, native people
- Participation measures* Offline style of interaction, to include users living in developing regions and in imagining innovative ways of computing
- Participation degrees:* Mutual shaping,

**Zorn et al. 2010**

- Participation theme:* Shared Design
- Related constructs:* Participation
- Construct definition:* Participation refers to connectedness and inclusiveness in taking part in processes and activities of crafting and building a shared artefact.

*Actors/Stakeholders*    Indigenous people, Western educated designers and developers, facilitator

*Participation measures*    Participative community meetings, aesthetic, unique, and lasting masterpiece, Un-destroyable life bond and sustainable design,

*Participation degrees:*    Wider participation, joint effort, connectedness of all

## Appendix D: Design-related conceptualisations of Participatory Design of review studies

Review Article	Conceptualising Community PD as a ...									
	Problem-solving	Product	Process, Action	Intention	Planning	Communication	Experience	Value	Professional Practice & Community organisation practice	Service
Aanestad et al. (2007)						*			*	
Ahmed (2007)	*			*					*	
Andrade & Urquhart (2012)				*					*	
Anokwa et al. (2009)							*		*	
Awotwi et al. (2011)					*					*
Aynekulu et al. (2006)	*		*							
Ballantyne & Addison (2000)					*				*	
Ballantyne (2009)								*	*	
Belliethathan et al (2008)	*	*								
Bidwell & Browning, (2010)			*				*		*	
Bidwell & Hardy (2009)							*		*	
Bidwell et al. (2011)	*								*	*
Blake & Garzon, (2012)	*	*	*							
Blake & Tucker (2006)	*	*							*	
Blake et al. (2001)	*	*	*							
Braa & Hedberg, (2002)	*	*	*	*						
Braa (1996)		*	*	*					*	
Brandt & Messeter, (2004)	*		*						*	
Breytenbach et al. (2012)	*	*	*							
Brown et al. (2012)			*	*						
Buskens, (2011)			*			*				
Byrne & Gregory, (2006)	*	*	*							
Byrne & Sahay (2007)		*	*							
Camara at al. (2008)			*					*		*
Chango (2007)		*	*						*	
Chawner (2012)		*	*							
Chetty et al. (2004)					*				*	
Chilundo & Sahay (2005)		*	*		*					
Cogburn (2004)										



Davis and Jabeen (2011)		*	*							
de Jager et al. (2012)			*						*	
de Vreede & Mgaya '06			*						*	
de Vreede et al '03			*				*		*	
Dearden (2008)				*					*	
Denison & Stillman, (2012)		*	*						*	
Dlodlo et al. (2008)									*	
Dralega et al. (2010)		*	*				*			
Elovaraa et al. (2006)		*	*							
Ferguson et al. (2013)									*	
Ford & Gelderblom (2003)	*	*	*		*					
Foth et al. (2006)		*	*							
Godjo (2010)			*				*			
Harvey (2011)		*					*			
Hellstrom and Karefelt (2012)										
Heukelman & Obono (2009)			*						*	
Jokonya & Hardman (2011)					*					
Kendall et al. (2006)			*	*						
Kimaro & Sahay (2007)			*						*	
Kimaro & Titlestad (2008)			*					*		*
Krauss (2012)			*						*	
Korpela et al. (1998)	*	*	*	*					*	
Leinonen et al. (2008)			*		*	*				
Lewis (2005)		*	*				*			
Loudon & Rivett (2011)		*	*	*						
Luk et al. (2008)		*	*							
Luo et al. (2010)	*		*						*	
Lwoga et al. (2010)							*		*	
Mainsah and Morrison (2012)			*				*			
Marsden (2008)			*						*	
Marsden et al. (2008)	*		*							
Masita-Mwangi et al (2011)		*	*						*	
Maunder et al. (2007)		*	*							
Mengesha (2010)									*	
Merritt & Stolterman (2012)		*					*			
Misuraca (2006)									*	
Morrison et al. (2012)		*	*							
Mosemghvdlishvili & Jansz (2012)			*						*	
Mosse & Byrne (2005)			*			*				
Msibi & Penzhorn (2010)								*	*	
Mtokho & Pade-Khene (2012)					*					*
Muhren et al. (2008)		*	*							
Muniafu et al. (2005)									*	

Mursu et al. (2000)					*					*
Ochara (2008)						*				
Ojo (2006)		*				*			*	
Pade-Khene et al. (2010)									*	
Pfeffer et al. (2013)					*			*	*	
Puri et al (2004)			*						*	
Ramachandran et al. (2007)			*						*	
Rodil et al. (2012)			*						*	
Schmidt (2004)			*							
Smith & Elder (2010)					*				*	
Thinyane et al. (2007)								*	*	*
Thompson & Walsham, (2010)			*						*	
Uwadia et al. (2006)			*						*	*
Vande Kar et al. (2006)					*					*
VanRensburg et al. (2008)							*	*	*	
Waema & Mitullah (2007)				*						*
Watson & McCubbrey (2009)			*					*	*	
Winschiers (2006)			*					*	*	
Winschiers-Theophilus (2009)										
Winschiers-Theophilus et al. (2010)			*					*	*	
Winschiers-Theophilus et al. (2012)									*	
Wyche et al. (2010)				*						
Zorn et al. (2010)								*	*	
<b>Number of Papers conceptualising design as a ...</b>	15	29	55	11	12	8	10	11	50	10

